Periodical TECHNOLOGY DEPARTMENT

WATER-WORKS NUMBER

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June
1928

Construction Methods

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McGraw-Hill Publishing Company, Inc., New York, N. Y.

Six-Mile Pipe Line, with Electrically Welded Seams and Riveted Girth Joints, for Springfield (Mass.) Water Supply

A MONTHLY PICTORIAL OF FIELD PRACTICE AND EQUIPMENT

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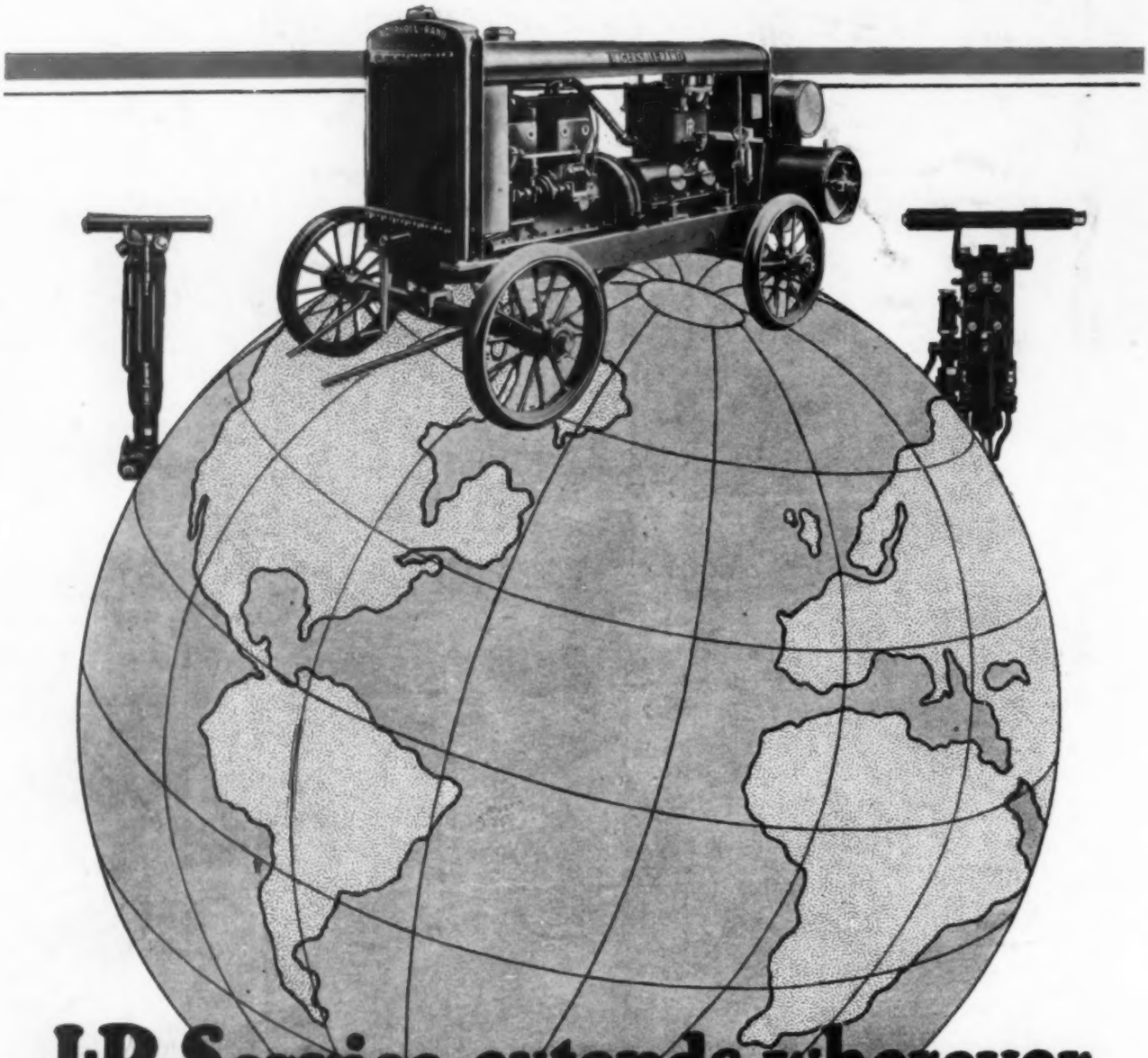

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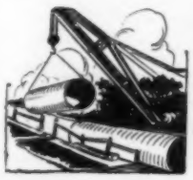
TECHNOLOGY DEPT.

What's Doing This Month

Looking it over with the Editor

WATER-WORKS CONSTRUCTION is the dominant note in this month's issue of *Construction Methods* appearing on the eve of the annual convention in San Francisco, June 11-14, of the American Water-Works Association. Here is a field in which annual expenditures for construction have been rising steadily ever since the forced curtailment of activities during the war. Its scope is broad, including pipe line work of all kinds, dams, aqueducts, filter plants, pumping stations, elevated tanks, storage reservoirs and a host of other structures, both large and small.



Water-works construction, however, involves the same basic methods and machinery as are employed in other fields. Old friends like the power shovel, the crane, the concrete mixer, the air compressor, the riveting hammer, the pump, the pile driver, the hoist, the tractor, the motor truck—in fact, almost every member of the family of standard construction equipment—is encountered on the water-works job.

Water-works construction, therefore, is not a specialty in the sense that it requires equipment and materials entirely different from those on other kinds of construction. The pneumatic riveting hammer, for example, is just as much at home on a steel pipe line as on a contract for erecting a steel bridge or a building. While this issue has a distinct water-works flavor, the methods and the plant illustrated and described, are, in general, applicable to other types of construction.

WITH SAN FRANCISCO the scene of this year's Water-Works convention particular interest attaches to the big dams and pipe lines that the East Bay Municipal Utility District of Oakland, Calif., is building. Progress pictures of some of these structures appear on pages 36 and 37.

CONSTRUCTION METHODS

A monthly review of modern construction practice and equipment

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From the Mail Bag

"*CONSTRUCTION METHODS* is the most interesting publication of the great number coming constantly to our offices—primarily so because its stories, told pictorially, are clear, up-to-date and easy to grasp."—President, building construction company, Nebraska.

* * *

"I have a copy of *Construction Methods* before me and want to say it

is a real builder's magazine. We enjoy it plenty here."—Construction superintendent, Indiana.

* * *

"Your illustrations and descriptions just warm right up to a man in the field, that's all. You're on the right track; keep it up."—Contractor, Pennsylvania.

* * *

"I find *Construction Methods* very interesting and think it a great help to any man who follows construction. Even my wife wants to see it first when it comes."—Steel welder, Canada.

* * *

"The articles of the magazine have furnished us with much intelligence."—Engineer, Japan.

PROGRESS in extending the applications of equipment or materials usually takes one of two forms: Developing something entirely new, or uncovering new uses for existing products. Under the second category two timely examples were cited in last month's issue of *Construction Methods*. Did you see them? One dealt with equipment and the other with materials. The finishing machine employed for years past on the construction of concrete pavement slabs is now being applied successfully to the spreading and surfacing of hot asphaltic paving mixtures, thus substituting a time-saving mechanical process for an operation that has been done for generations by hand shoveling and hand raking. The other case—of extending the use of a standard material of construction—was exemplified in the picture story in the May issue showing how precast cement tile slabs, developed primarily for the purpose of roofing, are being applied to the building of mausoleum crypts.

ACTUAL EQUIPMENT VALUE—A contractor may be a richer or a poorer man than his book-keeper's figures show. One large construction organization every year compares the *actual* resale value of its used equipment with the ledger value. Equipment dealers are called upon to assist in appraising the used machines. In the course of such a study the owner, by applying a yardstick of actual, instead of theoretical, value, usually finds means of increasing or conserving the usefulness of his plant, and of replacing, by improved new models, machinery that is either worn-out or obsolete in design. In the long run this practice results in lower operating costs and greater net profit.

THE 6-MILE STEEL PIPE LINE at Springfield, Mass., featured on p. 6 of this issue, is a notable example of a combination of electric welding and pneumatic riveting for a water supply conduit of fairly large size—54 and 48 in. in diameter. Fabrication in the shop is done by the multiple-arc electric welding process for the two longitudinal seams of each 30-ft. section of pipe, while connections in the field are made by riveting the girth joints with air hammers. The contract and specifications for the work made provision for bids on different types of pipe—all-riveted, lock-bar and electric welded. When the bids were canvassed, the lowest was found to be based on the use of pipe with welded longitudinal seams.

COMING: Among pictorial articles scheduled for early publication in *Construction Methods* are: The Tamiami Trail highway across the Florida Everglades; an electrically-welded railroad bridge; glazing methods on a big industrial building; special construction for a Shrine convention.

Here, Briefly, Are the Advantages You Receive

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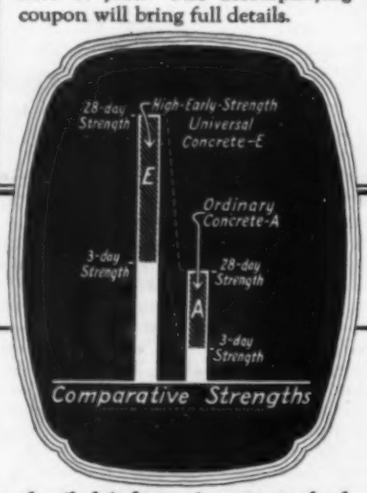

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WILLARD CHEVALIER
General Manager
ROBERT K. TOMLIN
Editor

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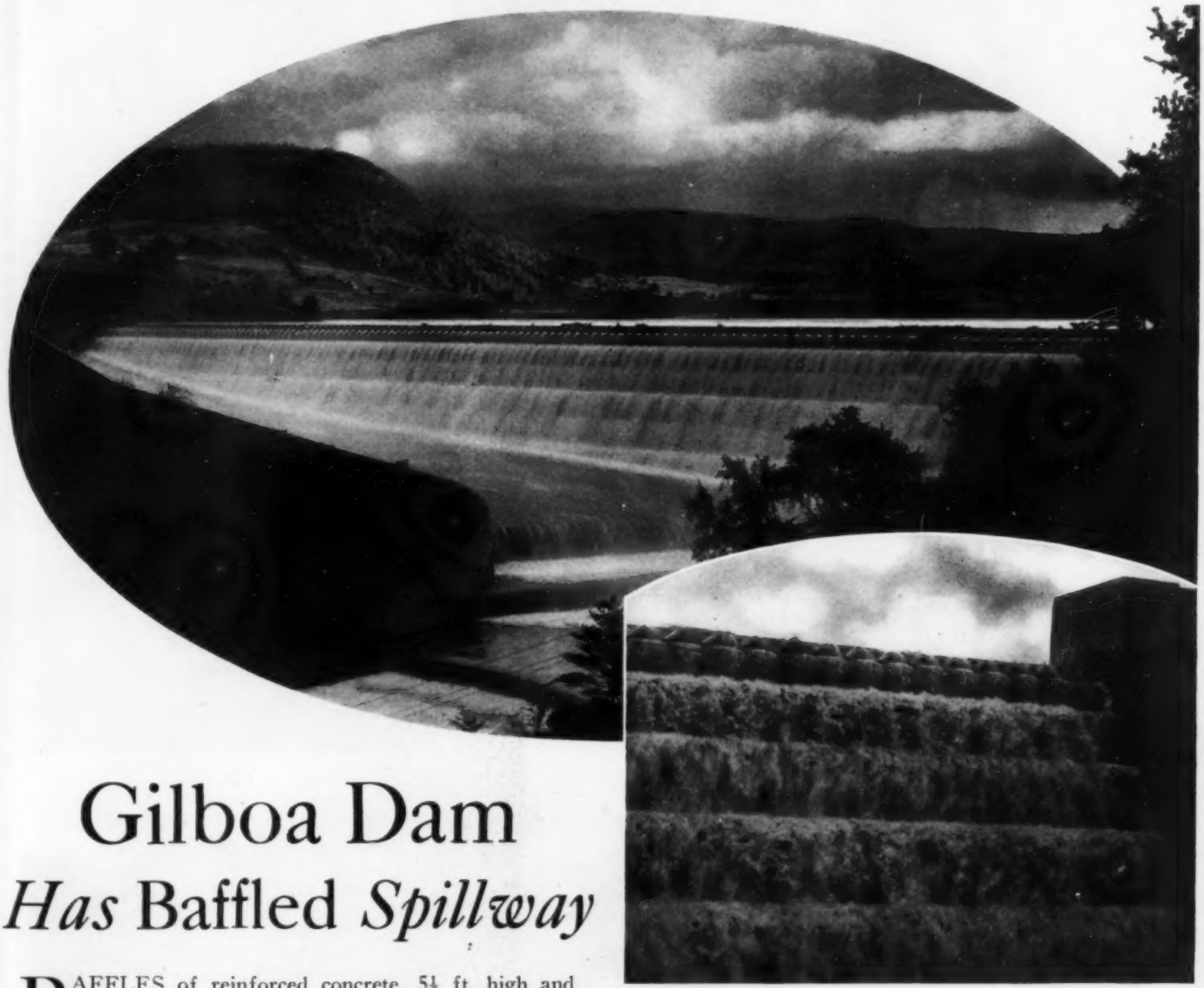
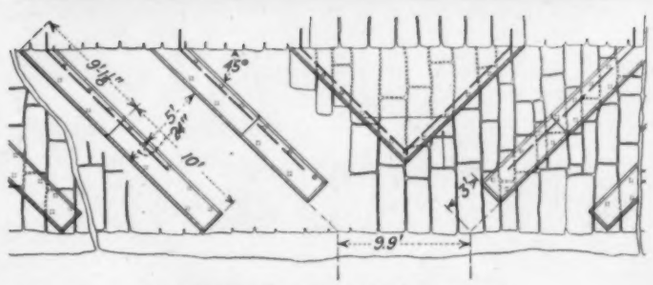


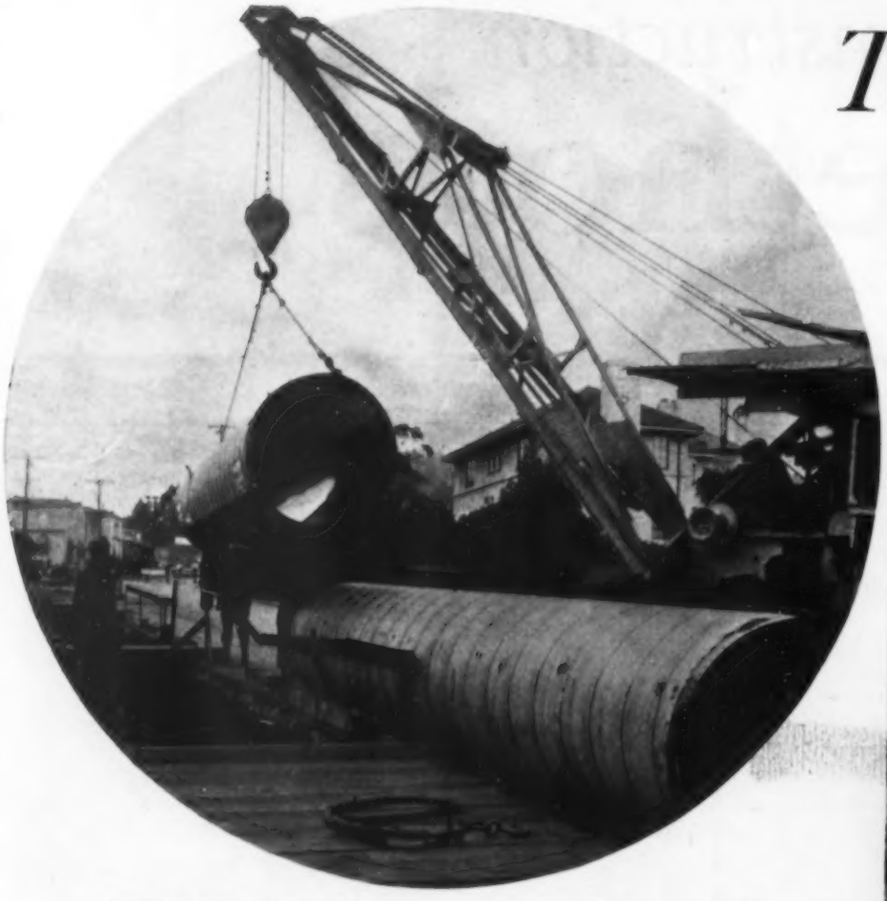
Gilboa Dam *Has* Baffled *Spillway*

BAFFLES of reinforced concrete, 5½ ft. high and set at an angle of 45 deg. with the direction of flow, break the force of water flowing over the crest of the Gilboa Dam of New York City's Catskill Aqueduct system. By turning the overflow at an angle to the face of the dam the Board of Water Supply's engineers, under Thaddeus Merriman, chief engineer, break up the solid sheet of water as it crosses the dam crest and cause it to descend by easy stages down the stepped face of the structure, thus preventing any long vertical drop even when the overflow velocity is high. The baffles not only change the direction of flow but cause a rolling action in the moving column of water passing over the dam crest.



DETAILS of concrete baffles on crest of Gilboa dam

This Month's



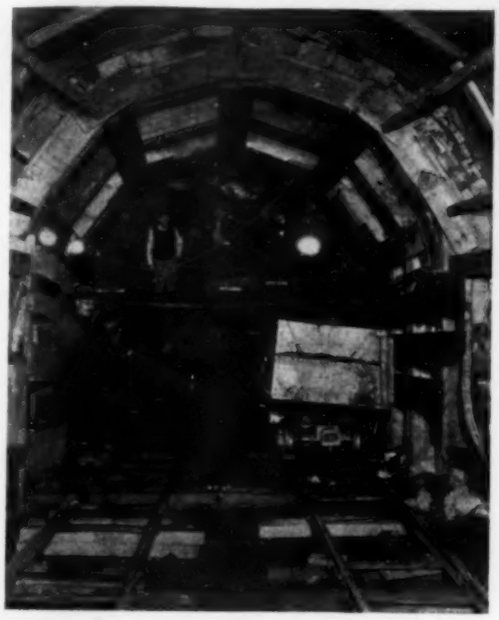
NEW 11-MILE ARTERY *(above)* for San Francisco's water supply. Western Pipe & Steel Co. fabricates and installs 54-in. conduit of lock-bar pipe for Spring Valley Water Co., to deliver 30,000,000 gal. daily.

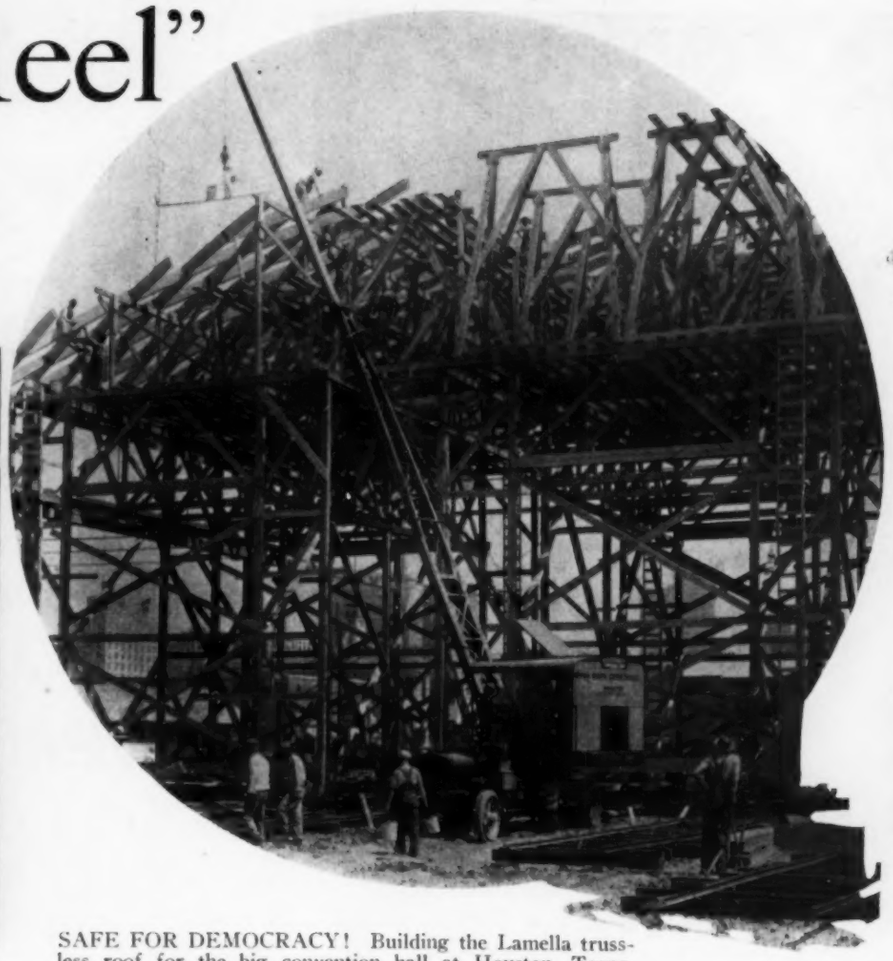
SHAVER LAKE DAM *(below)*, completed recently by the Construction Dept. of the Southern California Edison Co. under the direction of G. C. Ward, vice-president, E. R. Davis, manager, and A. F. Blight, ass't manager of construction. The concrete dam is 183 ft. high, 2,222 ft. long on the crest and stores 135,283 acre-ft.

LANDSCAPE TREATMENT *(below)* is applied to down-stream face of Wanaque dam by North Jersey District Water Supply Commission, Arthur H. Pratt, chief engineer.

"News Reel"

EXCAVATING HEADING *(below)* in Foothill Division tunnel of the Hetch Hetchy water supply project for San Francisco. The work is being done under the direction of M. M. O'Shaughnessy, city engineer.



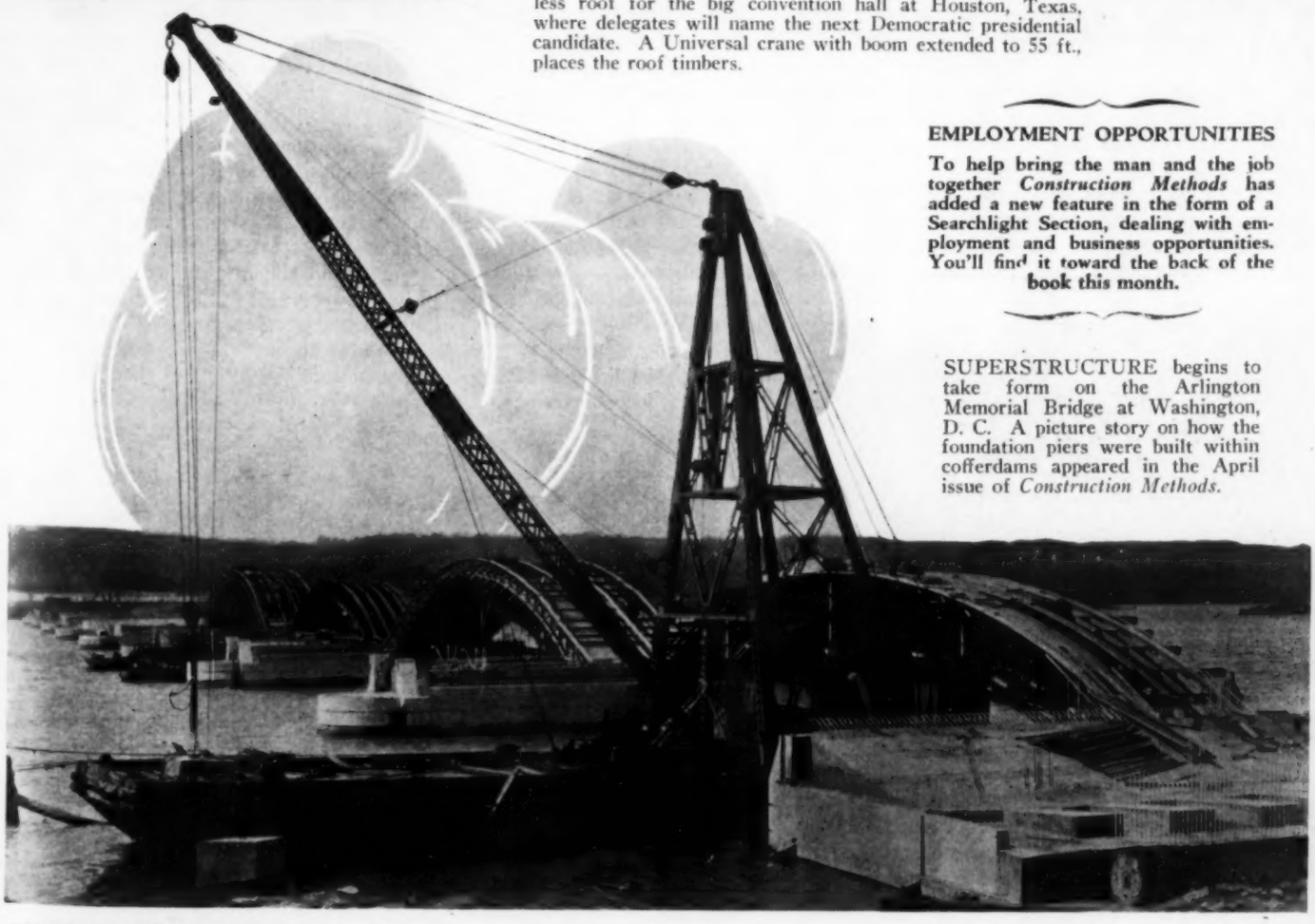


SAFE FOR DEMOCRACY! Building the Lamella trussless roof for the big convention hall at Houston, Texas, where delegates will name the next Democratic presidential candidate. A Universal crane with boom extended to 55 ft., places the roof timbers.

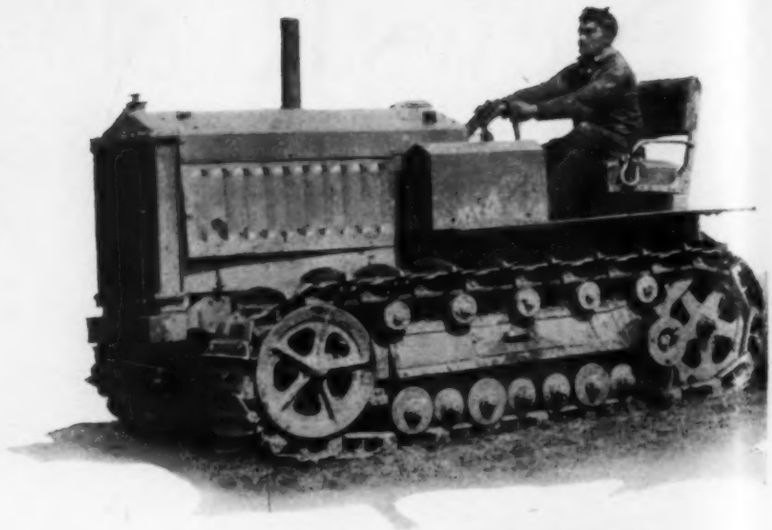
EMPLOYMENT OPPORTUNITIES

To help bring the man and the job together *Construction Methods* has added a new feature in the form of a Searchlight Section, dealing with employment and business opportunities. You'll find it toward the back of the book this month.

SUPERSTRUCTURE begins to take form on the Arlington Memorial Bridge at Washington, D. C. A picture story on how the foundation piers were built within cofferdams appeared in the April issue of *Construction Methods.*



PREPARING TRENCH and bringing bottom to proper grade for bedding the next 30-ft. section of steel pipe.



Six-Mile

Has Shop-Welded Seams and

Large Multiple-Arc Automatic Pipe in 30-ft. Lengths for

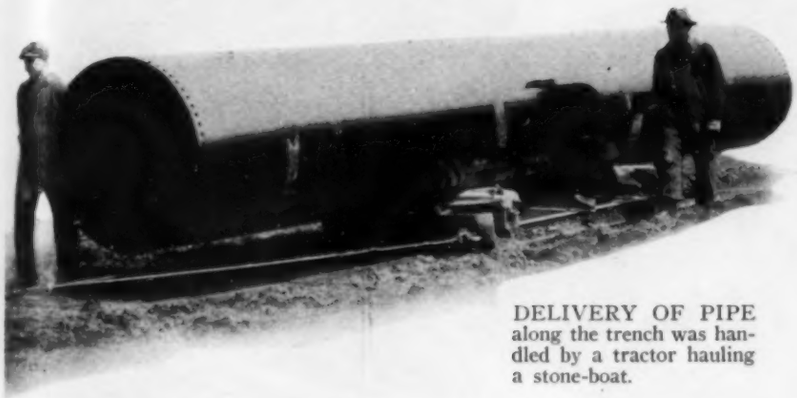
METALLIC arc welding in the shop for the longitudinal seams and compressed air riveting in the field for the girth joints are features of the 6¼ miles of 48 and 54-in. steel pipe that Elbert E. Lochridge, chief engineer of the Board of Water Commissioners of Springfield, Mass., is installing between Provo Mountain reservoir and the Connecticut River for the city's additional water supply from Little River. Plans and specifications were prepared in consultation with Allen Hazen, of Hazen & Whipple, civil engineers, of New York.

Bid Prices—Daniel O'Connell's Sons, Inc., of Holyoke, Mass., the low bidder, secured the contract at a bid price of $532,661 based on the use of 30-ft. pipe sections electrically welded along the two longitudinal seams at the shops of Walsh's Holyoke Steam Boiler Works; the same contractor submitted an alternative bid of $564,245 for riveted pipe. The next lowest bid on all-riveted construction was $585,955.

These bids were submitted in accordance with specifications which named riveted pipe and lock-bar pipe as acceptable, with the further stipulation that "bids may be made for other forms of pipe, such as welded pipe." The attitude of the Board of Water Commissioners is further indicated by the following quotation from its notice to contractors: "The Board desires to take advantage of improvements in the art and to give all possible opportunity for bidders to submit proposals for superior or different methods of pipe construction and protection."

PREPARATORY TO RIVETING the ends of the pipe sections are held together temporarily by a few bolts.

A PULL SHOVEL, operated by gasoline engine and mounted on crawlers, excavated the trench for the pipe line.



DELIVERY OF PIPE along the trench was handled by a tractor hauling a stone-boat.

LOCOMOTIVE CRANE picked up the 30-ft. pipe sections, weighing about 4 tons each and lowered them to place in the trench.

Pipe Line

Field-Riveted Girth Joints

Electric Welder Fabricates 48 and 54-in. Springfield (Mass.) Water Supply

The quantities of pipe and the unit prices "laid complete" (including pipe, trenching, field riveting of girth joints and back-fill) are given in the table herewith, summarizing the successful bid:

Pipe Quantities and Unit Prices

Pipe Diam.	Plate Thickness	Lin. Ft. of Pipe	Unit Price ("Laid Complete")
54 in.	7/16 in.	340	$16.13
54 in.	1/2 in.	7,500	13.88
54 in.	9/16 in.	7,000	14.91
54 in.	5/8 in.	1,300	16.61
48 in.	9/16 in.	5,800	14.05
48 in.	5/8 in.	10,800	15.03
Total		32,740	

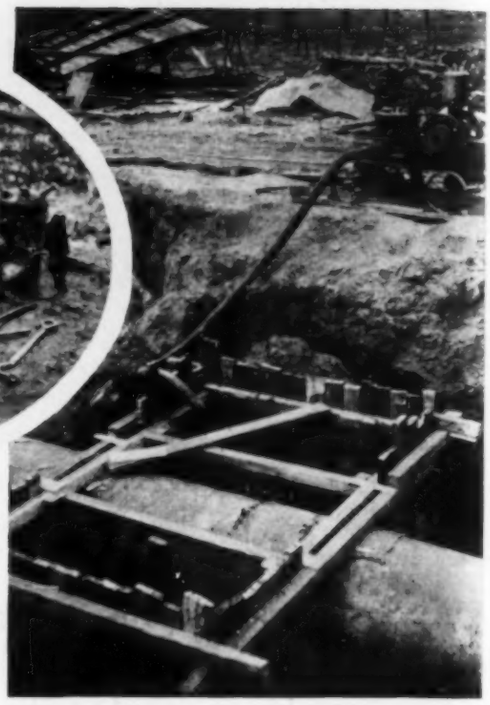
Construction Procedure — For the most part the location is through sandy soil containing some clay. The bottom of the pipe line trench parallels the ground surface generally at a depth of 8 to 10 ft., with one deep cut of about 23 ft. for a short length. There are only a few stretches of embankment, aggregating 10,500 cu.yd. The trench in some sections is wet, calling for the use of portable diaphragm trench pumps.

The O'Connell forces are handling the trench excavation with a 1¼-yd. Northwest gasoline pull-shovel. Pipe, in 30-ft. lengths, arrives by motor truck from the Walsh shops at Holyoke, about ten miles from Springfield and is delivered along the trench by a stone-boat equipped with wooden cradles and hauled by a Cletrac tractor. An Erie steam crane on crawlers swings the pipe sections into the trench where the end of the new section is inserted into the pipe already in place and held by a few temporary bolts through the punched rivet holes until the riveting gangs come along to complete the circumferential lap joint con-

TO PROTECT PIPE COATING a burlap cushion girdles the pipe where it is held by the rope sling from the crane hook.

LAP JOINTS are readily made as new section telescopes into end of line already in place.

DIAPHRAGM PUMPS, operated by gasoline power, unwatered the trench.



BACKFILL is placed between joints to weight down the pipe and prevent flotation by ground water prior to field test.

BOX COFFERDAM of timber sheeting was placed around girth joints and pumped out before riveting began.

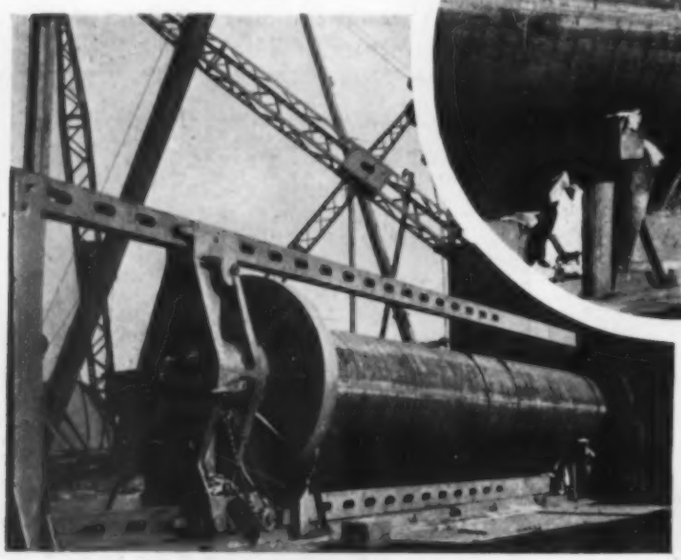
nections. The pipe is then partially back-filled between girth joints, to prevent flotation; girth joints are left uncovered until a section of pipe has withstood a hydraulic test for leakage at a pressure of 100 lb. per square inch above actual service pressure.

Compressed air for field-riveting is supplied by one Sullivan and two Chicago Pneumatic portable compressors serving riveting guns, calking hammers and reaming tools; 2,400 ft. of air line is laid along the trench from the compressor plant, which is moved periodically as pipe-laying work progresses.

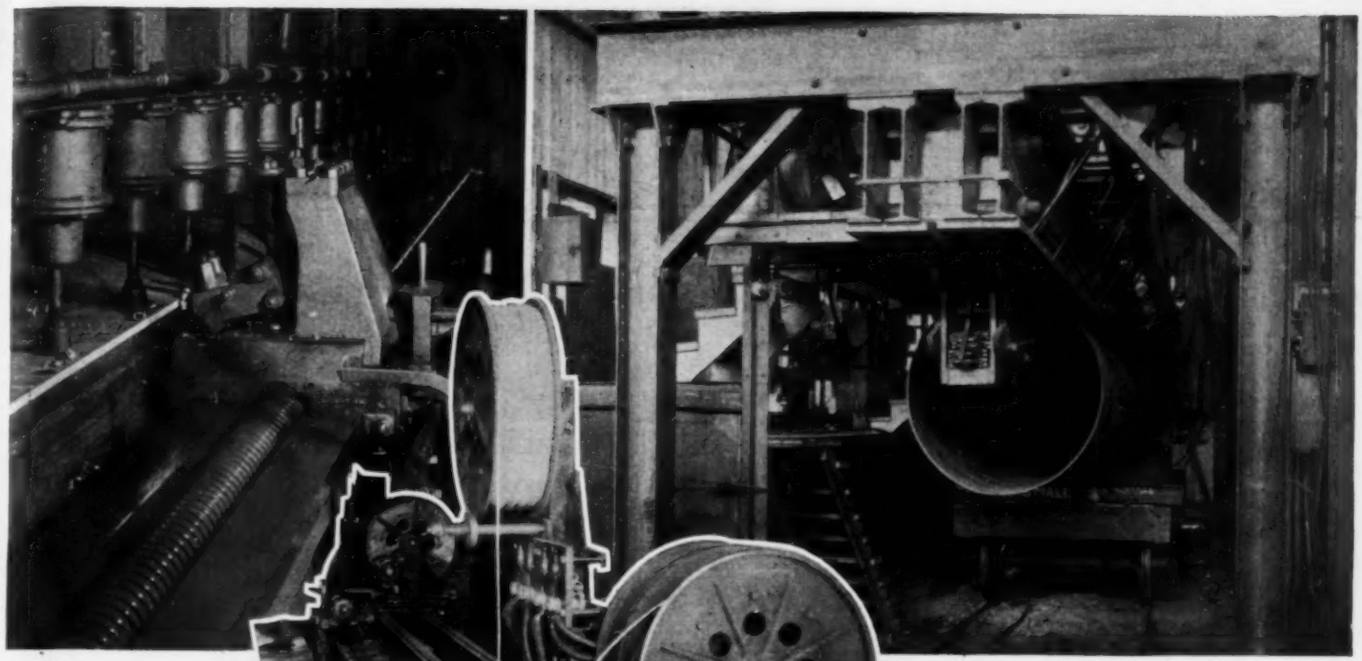
In wet sections of the trench, before riveting is begun, the contractor builds timber-sheeted sumps around the joints. Water is removed by Carter diaphragm pumps so that the riveters may work inside of a dry section of pipe. Care is taken in laying pipe to prevent a continuous line of longitudinal seams; they are offset 22½ deg. in adjoining pipe lengths.

For embankment work the specifications provide for a top width of 10 ft. and an elevation for the top of the fill 3 ft. above the top of the pipe. The embankment slopes are 1 on 2.

Steel Pipe—The pipe for this job, aggregating about 4,500 tons of 48 and 54 in. sizes, is made in 30-ft. sections from plates of fire-box steel, with a specified tensile strength of from 52,000 to 62,000 lb. per square inch. The fabrication process, carried out at the Walsh shops in Holyoke, under the direction of Vincent P. Marran, gen-



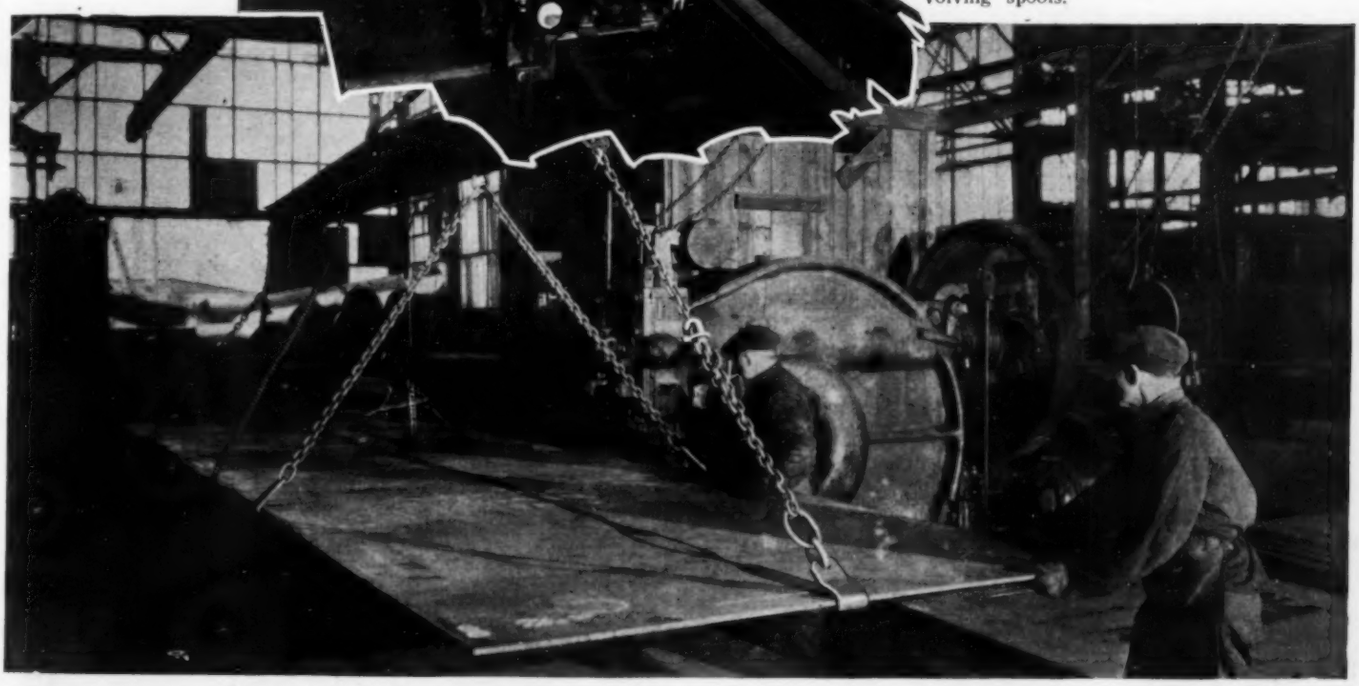
HYDRAULIC TESTS at 333 lb. per square inch were made on each 30-ft. pipe section before it left the shops. *At left:* Placing a pipe length in the testing machine. *In circle:* Removing a section of pipe after it has passed the test. *At right:* Calking the joint between end of pipe and the lead-gasketed face of the testing machine, preparatory to applying hydraulic pressure. All of these views show the electrically welded longitudinal seam.



PLANING edges of steel plate to form bevel for electric welding.

ELECTRIC WELDER (*above*) with pipe section in place on pneumatically cushioned backing-up-bar.

MULTIPLE - ARC welding heads (*left*) with metallic electrode wire being fed automatically from revolving spools.



SHEARING one of big steel plates prior to rolling into semi-circular shape. The cut is made at a slight taper so as to produce pipe lengths whose ends will telescope for making lap joints in the field.

eral manager, consists of the following steps:

Fabrication Methods — Unloaded from railway cars by a crane hoist and an electric magnet, the large flat steel plates are first laid out and marked for cutting by powerful shears. The cuts are made at a slight taper to produce pipe sections with one end slightly larger than the other so that they will telescope easily in making the lap joints in the field. The sheared plate then is beveled on the ends to facilitate calking of the finished pipe in the trench.

Then comes the operation of planing the longitudinal edges of the plates to form bevels for welding the seams electrically. The bevel in the plates along the pipe seams has a radius of $\frac{7}{16}$ in., and when the edges of the plates are brought together for welding the opening at the top of the joint must be within the specified limits of $\frac{1}{8}$ and $\frac{7}{16}$ in.

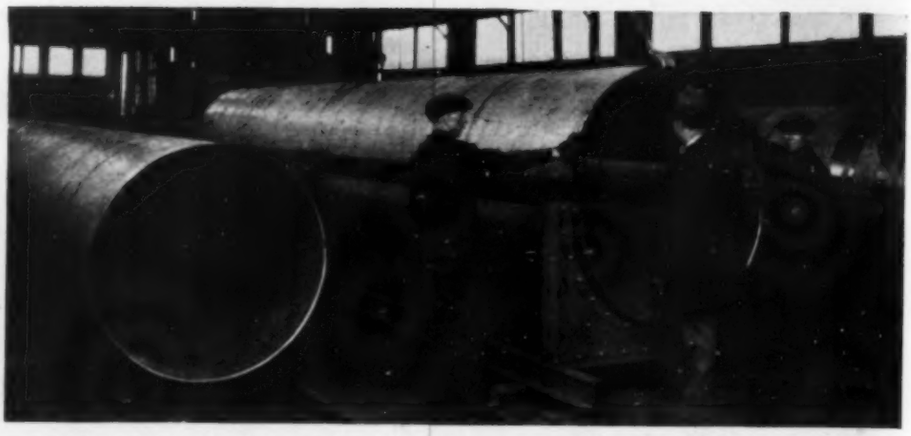
After crimping, the plates enter huge rolls from which they emerge as semi-circular sections. Two halves of the pipe are then assembled in a cradle and electrically tack-welded on the inside to hold them during the process of machine welding the longitudinal seams. To present a uniform surface to the backing-up bar of the large welder the tack welds are ground down smooth from the inside.

Electric Welding—The welding of the 30-ft. pipe sections is done by a General Electric Company automatic metallic arc seam welder, one of the largest units in service for this kind of work. It is equipped with two traveling welding heads, each carrying a pair of metal wire electrodes mounted 8 in. apart.

As a guide for the welding of the seams a line is scribed on each plate parallel to the upper edge of the bevel and $\frac{3}{4}$ in. from it. The specifications require that the width of the bead shall not exceed 1 in. or be less than $\frac{5}{8}$ in. No weld is accepted if its height is less than $\frac{1}{32}$ in. or more than $\frac{1}{8}$ in. above the plate surface.

In the welder the pipe is mounted horizontally on a backing-up bar carrying a rounded copper strip 2 in. wide which is pressed up tight against the under side of the pipe by a pneumatic clamp, carrying air at 80 lb. per square inch pressure to insure uniform contact of pipe and bar throughout the entire 30-ft. length. The upper part of the clamp consists of two copper jaws, 2 in. apart, straddling the seam to be welded. A magnetic control circuit is provided in the backing-up bar to reduce the magnetic disturbances of the arc when welding.

With the pipe tightly clamped in the machine the two automatic welding heads, propelled by a single travel carriage, start their journey along the seam, one attacking the pipe at an end and the other at the middle, and both traveling in the same direction at a speed of about $4\frac{1}{2}$ in. per minute.



CRADLE holds pipe during tack-welding prior to final welding in multiple-arc machine.

Originally, only one welding head was used; by employing two welding heads the time required on each pipe section is halved.

The first of the two wire electrodes in each welding head fills up a little less than half the depth of the joint, which is completed by the passage of the second electrode spaced 8 in. behind the first.

With one seam welded, the clamps are loosened, the pipe is revolved through an angle of 180 deg., and the process repeated on the other joint.

With its two seams electrically welded, the 30-ft. pipe section is removed from the welder and inspected. Hand welding is done on any spots that require touching up and joints are smoothed down by grinders.

Hydraulic Test—Each pipe section then enters the hydraulic testing machine where the pressure of 333 lb. per square inch is applied. On April 6 one 30-ft. section of 48-in. diameter welded pipe, made of $\frac{1}{2}$-in. plate was tested to destruction; it took a pressure of 912 lb. per square inch to cause rupture.

Pipe Coating—After having both inside and outside surfaces cleaned with revolving wire brushes, the pipe is picked up by a derrick and dipped vertically in a tank of coal tar pitch varnish at a temperature of 310 to 320 deg. F. Each pipe receives two dippings, the pipe section being reversed on its second entry into the deep vertical tank. The dipped pipe is then laid on skids and after the coating hardens in about half an hour is ready for loading on motor trucks for shipment to the job.

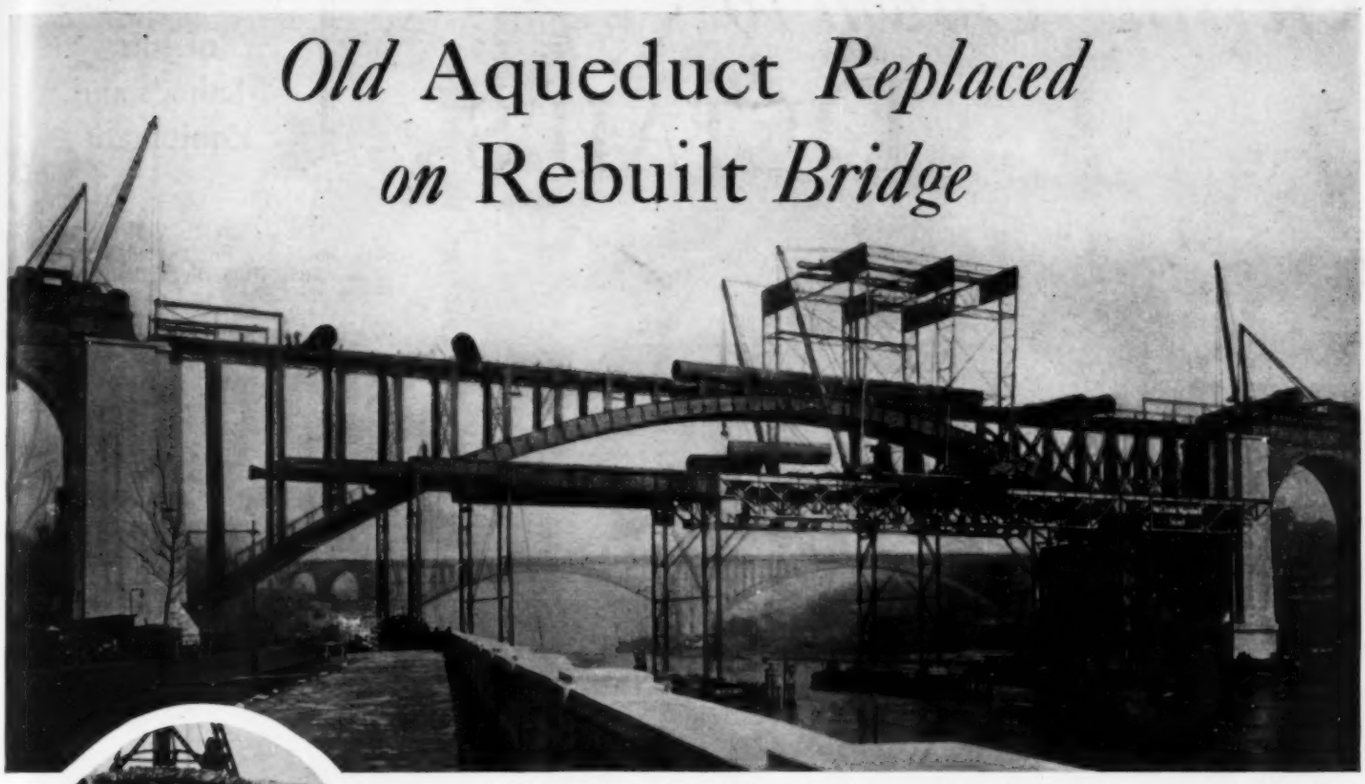
Construction of the Springfield pipe line is in immediate charge of J. B. Porter, assistant chief engineer for the Board of Water Commissioners.

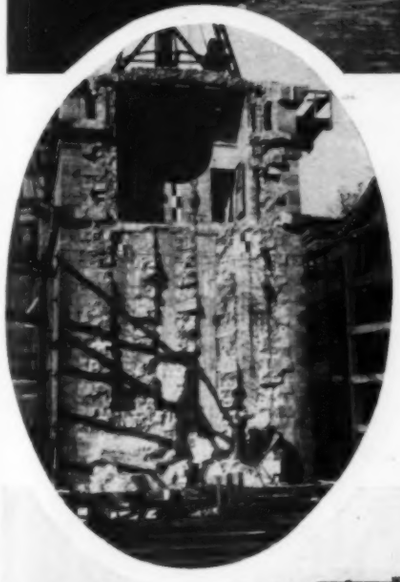
DIPPING a 30-ft. pipe section in a bath of hot coal tar pitch varnish.

WIRE BRUSH cleaning of pipe surface preparatory to dipping.

BULLDOGGING pipe ends to produce slight flare for making field joints.

Old Aqueduct *Replaced on* Rebuilt *Bridge*





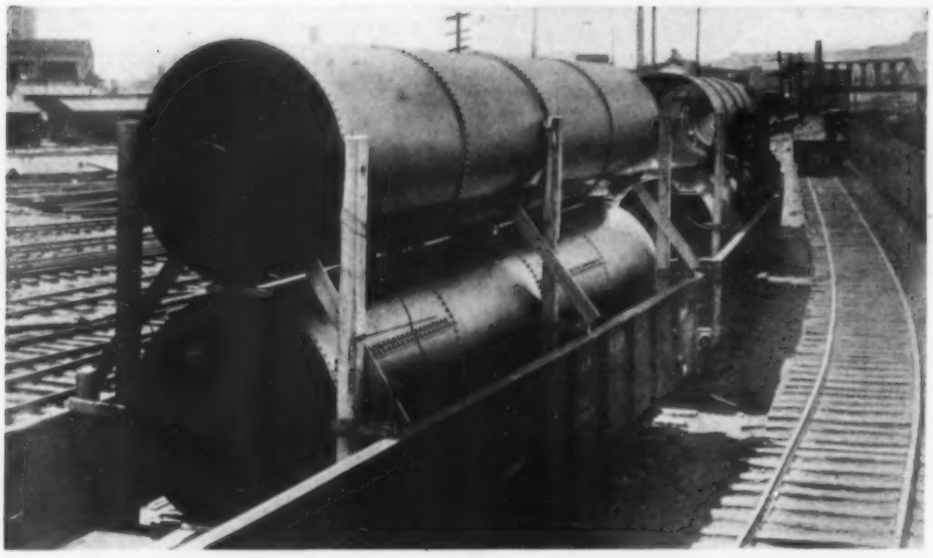
TRAVELING GANTRY *(above)* raises old pipe sections to place on new steel span over Harlem River. PIPE-LINE OPENING *(left)* where arch masonry was removed.

AN IMPORTANT detail of the reconstruction of High Bridge over the Harlem River, New York City, described in *Construction Methods* last month, involved the temporary removal and replacement of a 90½-in. pipe line installed in 1861 to form part of the old Croton aqueduct. The pipe, carried over the river on masonry arches, was removed in sections before the old bridge structure was torn down and replaced by a new steel arch. Under the direction of Edward A. Byrne, chief engineer of the Department of Plant and Structures, New York City, the P. T. Cox Contracting Co. replaced the pipe with the same big traveling gantry that had handled the bridge demolition and steel erection work.

UNCOVERING OLD AQUEDUCT line prior to demolishing its masonry arch supports. How old pipe *(in insert)* was carried on pedestal supports.

Getting Down to DETAILS

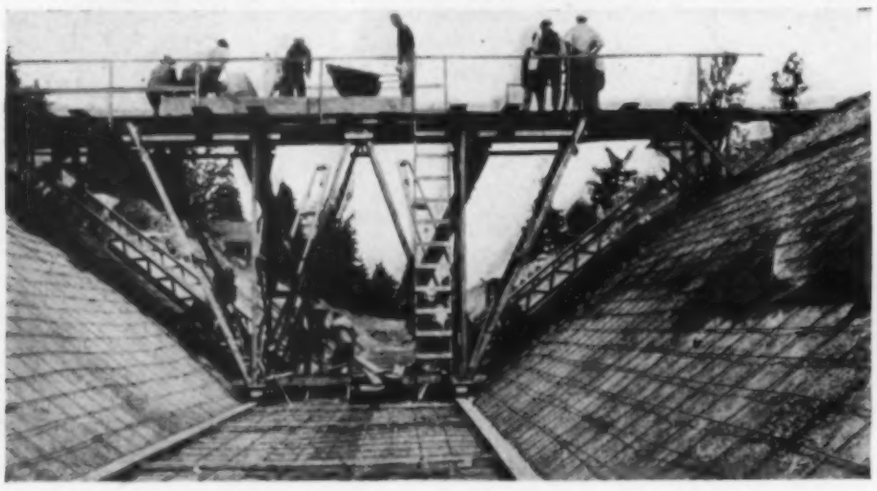
Close-up Shots of Job Methods and Equipment



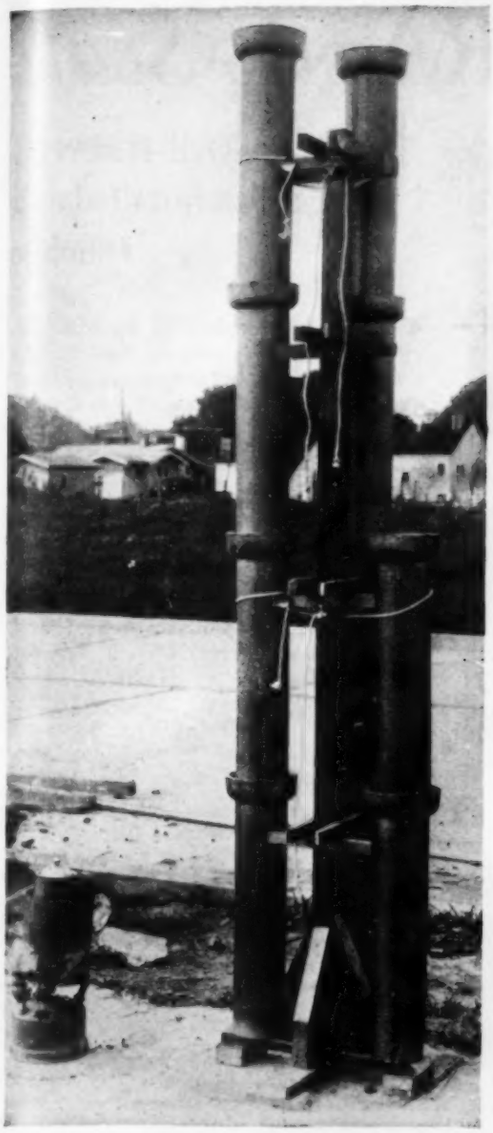
TIMBER FRAMEWORK (*left*) for holding 72-in. riveted steel pipe during trip from Biggs Boiler Works in Akron, Ohio, to Brooklyn, N. Y., for use on Williamsburg conduit of Catskill aqueduct. Uprights are 6x6's, 10 ft. long, bolted to pipes and framed with shorter pieces to wedge against car sides. On each end are 2-in. supporting pieces bolted to the pipe. This method of shipment prevented movement of pipe in transit.

(In oval below) SWINGING CRANE on service truck simplifies handling of cast-iron pipe for waterworks construction at Miami, Fla.

MOVABLE WOODEN TRESTLE (*below*) handles steel forms and concrete for lining the main canal on the Kittitas division of the U. S. Bureau of Reclamation's Yakima Project in Washington.



GUY DERRICK helps Chicago Bridge & Iron Works erect 1,000,000-gal. tank for Miami (Fla.) Water Co.



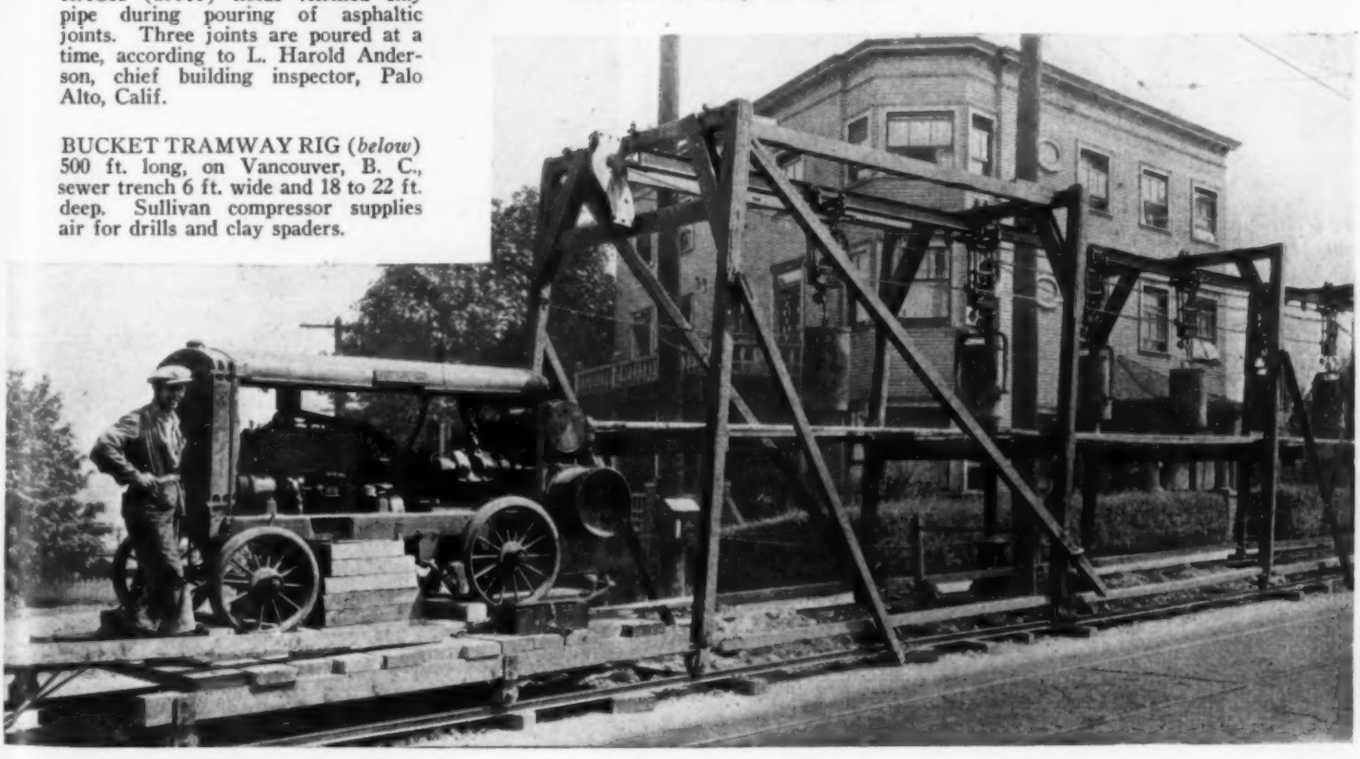
RACK (*above*) holds vitrified clay pipe during pouring of asphaltic joints. Three joints are poured at a time, according to L. Harold Anderson, chief building inspector, Palo Alto, Calif.

ROTARY GRINDERS operated by air from a portable Ingersoll-Rand compressor clean 24-in. pipe for the Washington (D. C.) Gas Light Co.

©International

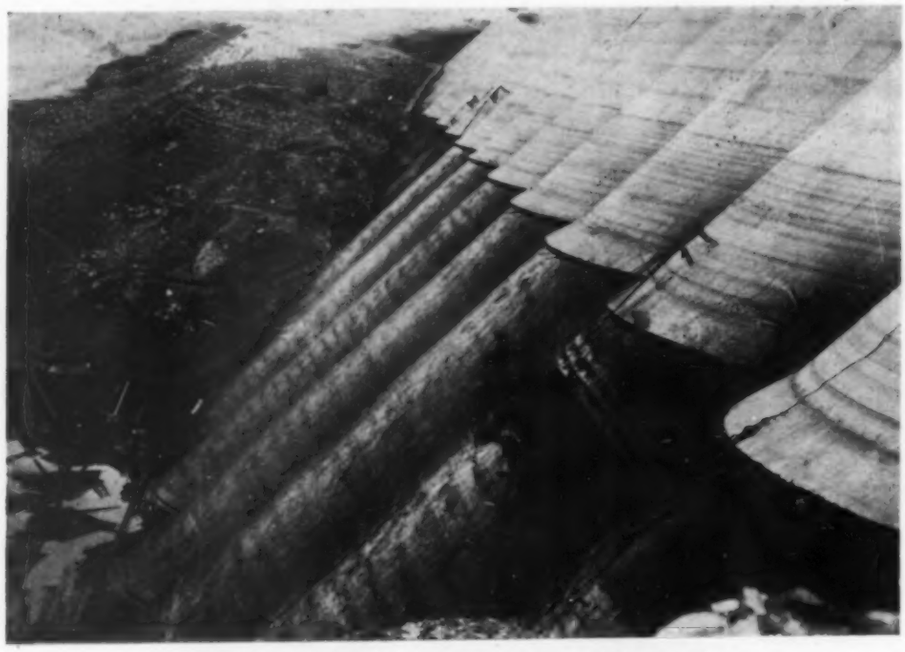
A MECHANICAL CURRY-COMB for water filter sand beds at Philadelphia. This device, mounted on a tractor, has hollow rotating teeth which break up the clogged sand surface and inject water under pressure to wash away the impurities.

BUCKET TRAMWAY RIG (*below*) 500 ft. long, on Vancouver, B. C., sewer trench 6 ft. wide and 18 to 22 ft. deep. Sullivan compressor supplies air for drills and clay spaders.



ASPHALTIC MEMBRANE *Seals*

Mountain Dell Reservoir Waterproofed as a Damage



APPLYING MEMBRANE SHEETS and asphalt mopping to curved surface of multiple arches forming Mountain Dell dam.

WHEN the face of the multiple-arch concrete dam forming the Mountain Dell reservoir near Salt Lake City, Utah, had become slightly disintegrated through frost action, H. C. Jessen, city engineer, let a contract to the Galigher Machinery Co., of Salt Lake City, to line the dam with a permanent preservative coat. The body of the lining is composed of three plies of Carey pre-formed membrane, $\frac{1}{4}$ in. thick and formed of $\frac{1}{8}$ in. of pure asphalt sandwiched between two 3 x 5-ft. sheets of 30-lb. waterproofing felt.

A PRIMER COAT of hot asphalt was applied to the concrete surface before the membrane sheets were laid.

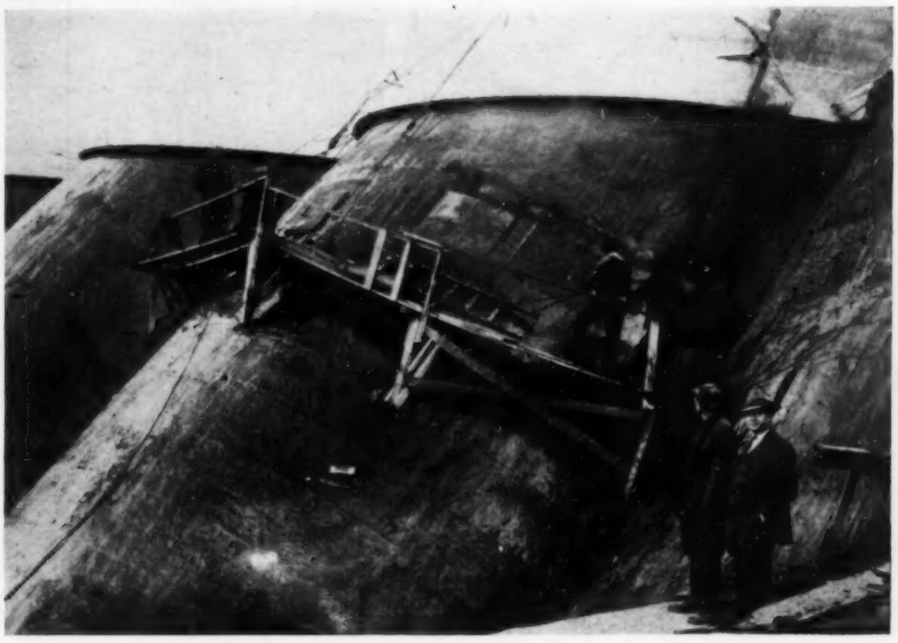
LINING OPERATIONS nearing completion, showing asphalt heating kettles. The body of the lining consists of three plies of pre-formed membrane in

Face of Multiple Arch Concrete Dam

Structure, Salt Lake City Precaution Against by Frost

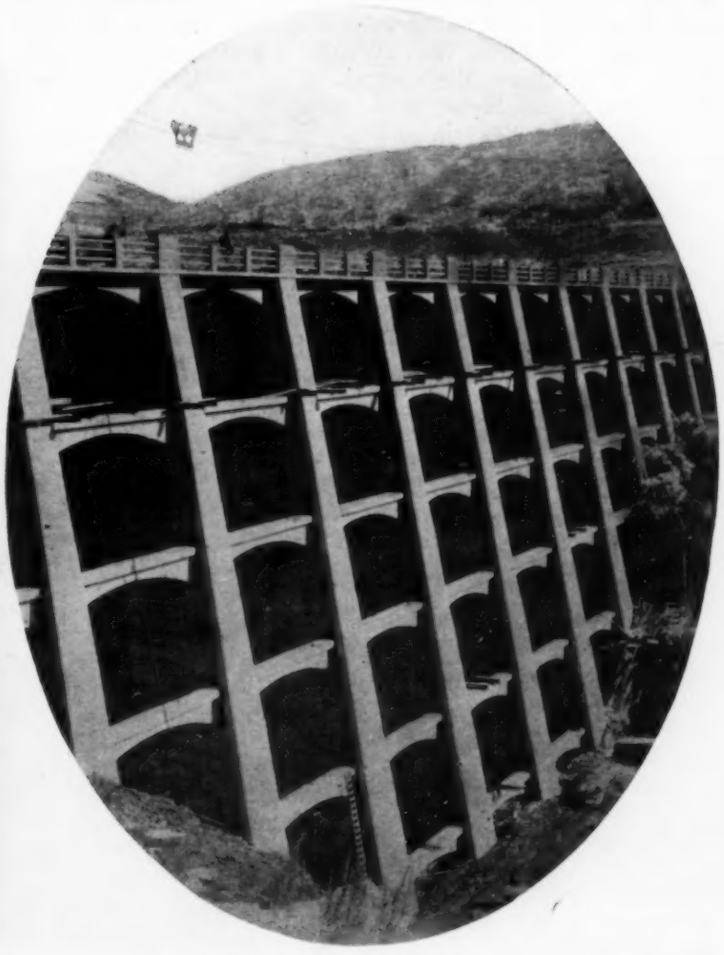
A coat of primer was first applied to the face of the dam. Sheets of membrane, heated, were laid and malleted, and a heavy mopping of asphalt preceded the application of the next layer. The top stratum of membrane was mopped and sheets of 15-lb. waterproofing were rolled in with joints overlapping 3 in. to form the surface. This surface was given a final mopping of pure asphalt.

The seal along the bottom of the dam was formed of four strips of canvas, each strip wider than the one beneath; the top strip was 27 in. wide.



FROM SCAFFOLD, suspended on the inclined surface of the dam, membrane sheets were laid and malleted.

3 x 5-ft. sheets composed of layers of asphalt and waterproofing felt. Under City Engineer Jessen the work was done by the Galigher Machinery Co.



DOWNSTREAM FACE showing construction of multiple-arch type of concrete drum.

FOR HANDLING MATERIALS at the dam site the contractor installed two guy derricks and a tower for distributing the concrete.

FORM WORK closing the channel-way in the dam after sufficient openings had been left to take care of storm water. The masonry was poured in steps. Concrete, in buckets, was delivered by a dinkey train.

An 80-Ft. Dam of Cyclopean Masonry

IN BUILDING a cyclopean masonry dam 80 ft. high and 325 ft. long for the Richmond Development Corporation at Carvin's Cove Falls, near Roanoke, Va., W. W. Boxley & Company, the contractors, made their plant layout with three primary considerations in mind: (1) Easy delivery of quarry rock for the dam masonry; (2) elevation of mixer plant with respect to the dam; (3) maintenance of traffic over a nearby county road.

Below the quarry site selected (downstream from the dam) the contractors installed a blacksmith shop, compressor house, rock crusher, and concrete mixing plant with two lines of narrow-gage track serving for the delivery of materials, one to the base of the dam and the other to the quarry.

At the quarry a portable crane loaded small rock on to a cable car for the crusher and large rock on to a dinkey engine train for use in the cyclopean masonry.

At the dam the contractor erected two derricks, one on either side of the stream. The lower derrick was set up in the center of the dam structure, and the higher one at the west end. The latter, after completing the west end of the structure, was moved to a corresponding elevation on the east end. The lower derrick in the center, however, fulfilled its purpose until the completion of the work and did not require any moving.

With the exception of the arch work at the crest and the downstream toe, no special form work was necessary. Forms were made in sections, held by rods and moved as the work progressed.

A large movable tower distributed the concrete which was delivered in buckets from the mixer plant. It was moved about by the derricks as work progressed and served as a landing place to distribute concrete which could not be directly placed by the derricks. When it was possible to dump the concrete into the proper location from the derricks the movable tower was set to one side. For the cyclopean masonry all large rock was washed before it was placed in the concrete, one man being especially assigned to this work.

CABLEWAY across dam assisted in erecting derricks. Concrete distributing tower in the foreground was moved about as construction advanced.

During construction the flow of the stream was taken care of by leaving a vertical opening or keyway at the center of the dam. Into this keyway effluent pipes were later built and the opening then sealed.

The principal items of plant equipment on the job are listed in the accompanying inventory. The completed structure contained 16,690 cu.yd. of cyclopean masonry and 530 cu.yd. of reinforced concrete in the gate chambers. The dam develops a water supply of at least 15,000,000 gallons daily.

As general manager for the Richmond Development Corporation Charles E. Moore was in charge of the work.

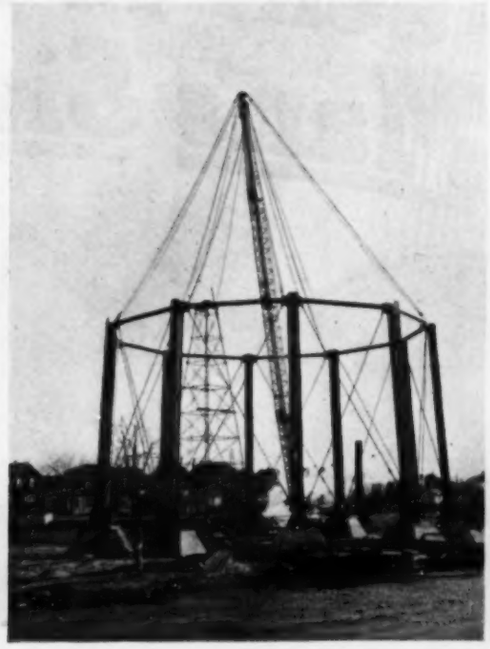
Contractor's
EQUIPMENT INVENTORY

1 Air compressor (Ingersoll-Rand)
1 Drill sharpener (Ingersoll-Rand)
1 Oil furnace (Ingersoll-Rand)
Drills
1 Crusher plant (Buchanan)
2 Hoists (Lambert)
1 Loco. crane (Osgood)
1 Dinkey (Porter)
4 Flat cars (K. & J.)
1 Dump car (K. & J.)
4 Concrete buckets (Steubner)
3 Motor trucks (White, G.M.C. and Ford)

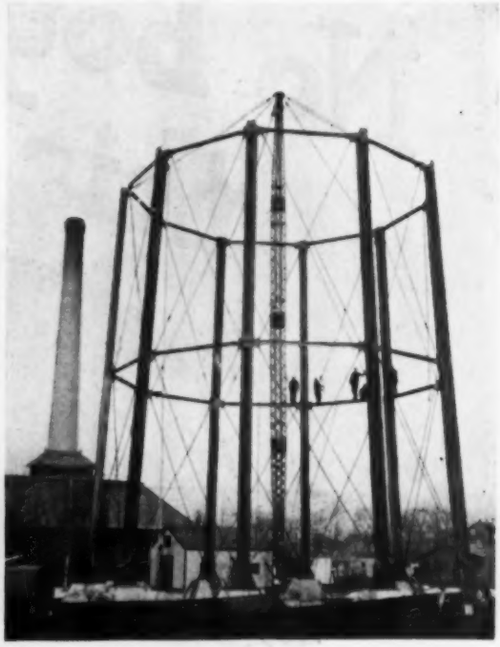
Step-by-Step Field Methods—

ERECTED AN ELEVATED TANK

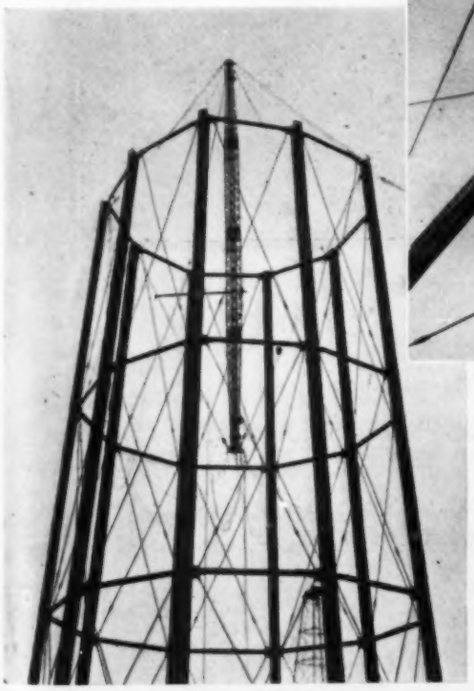
1 AN 80-FOOT GIN POLE was the principal item that Fred Palm, superintendent for the Pittsburgh-Des Moines Steel Co., used in erecting a 500,000-gal. tank for the water supply of Hempstead, N. Y., under the direction of C. E. Marshall, village engineer. After a ring of concrete piers had been cast, the first column was set in place.



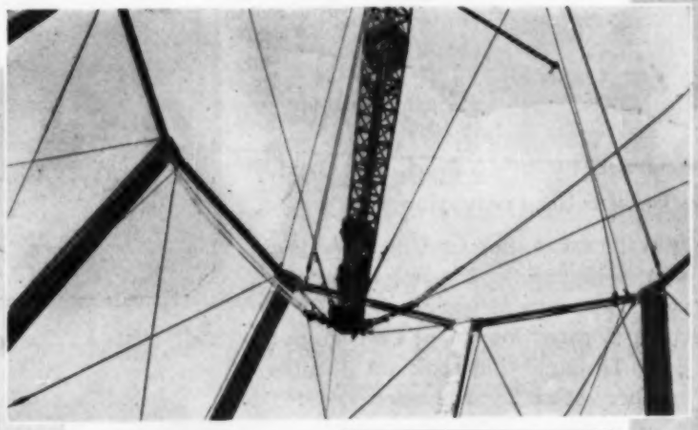
2 FIRST TIER OF COLUMNS completed. The gin pole is now guyed by cables to the tops of the columns and is ready to proceed with the erection of the second tier of columns.



3 STEEL ERECTION has now reached a stage beyond the further capacity of the 80-ft. gin pole with its base at ground level. The next step, therefore, is to



4 RAISE THE GIN POLE and support it in mid-air as a "basket pole" by cables from the tops of the third tier of columns.



5 BASKET POLE details herewith show how the latticed steel erecting unit is carried by cables to extend its lifting range.

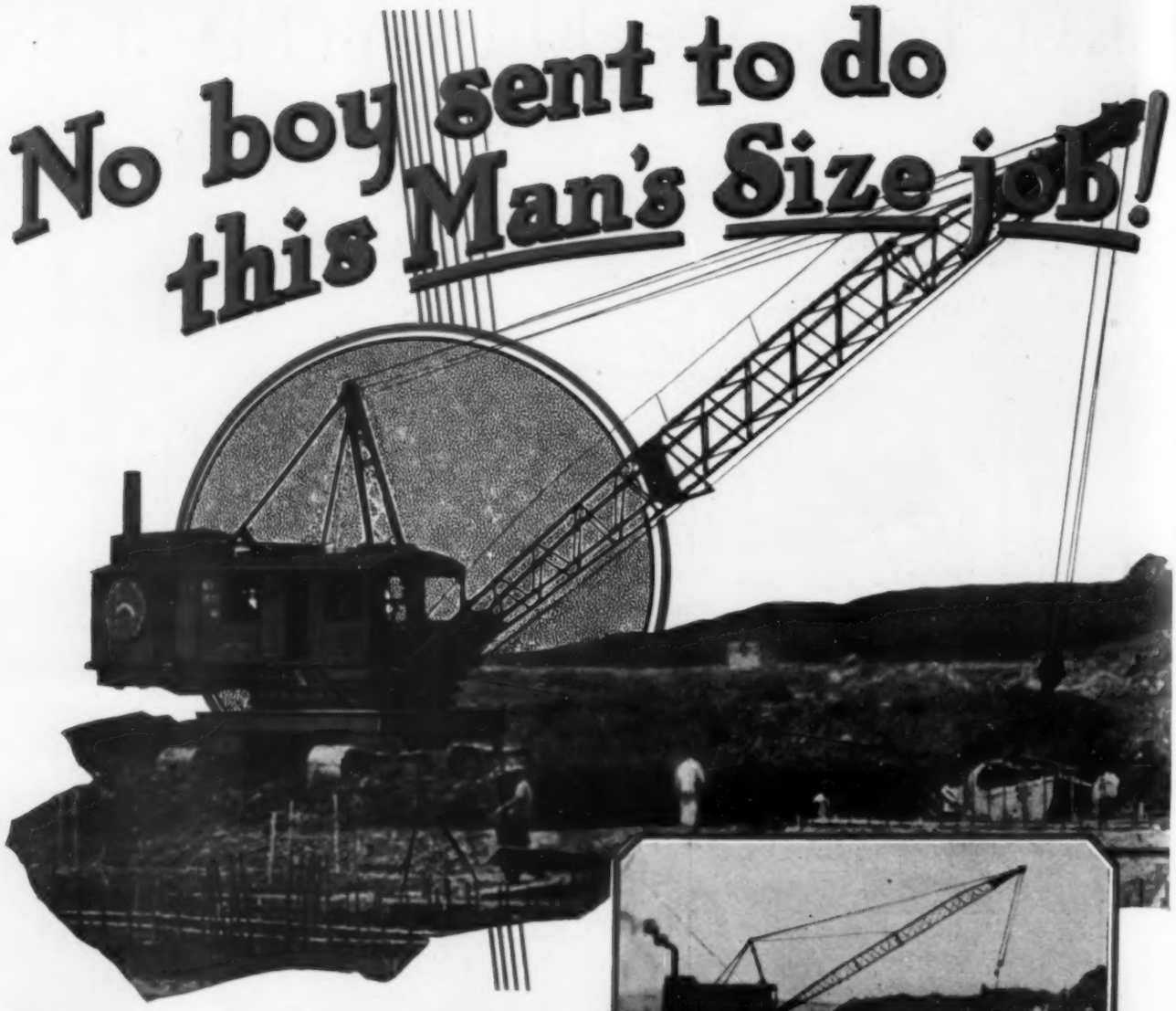
6 NEARING COMPLETION: Lower portion of the tank has been riveted and is ready for top section: the structure, complete, cost $41,900. It is 173 ft. high from foundation piers to water level in tank.

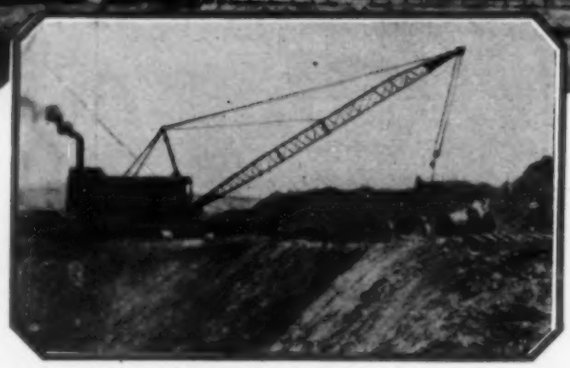
NEXT MONTH

An out-of-the-ordinary road building job:

"Constructing the Tamiami Trail Highway Across the Florida Everglades"

No boy sent to do this Man's Size job!





Extra profits were earned by using 2-yd. and 3-yd. machines for this big excavation.

300,000 *cubic yards* in the excavation for Chicago's new sewage treatment plant— one of the big holes was 400 feet long by 150 feet wide, and over 50 feet deep.

So the T. J. Forschner Contracting Co. of Chicago put in a big BUCYRUS-ERIE Dragline that took out 3 cubic yards a bite— and another with a 2-yard bucket.

If there's money in the contract— More Speed Means More Profit

And these big draglines work under perfect control— little finish trimming was needed on the pump house excavation, where the 3-yd. machine pulled out some 90,000 yards. A good deal of the spoil was *dumped into narrow 5-yard trailers.*

Whatever the size of machine you're using— or the type of power— the *extra strength* and *extra speed* that are built into BUCYRUS-ERIES mean *extra profits.*

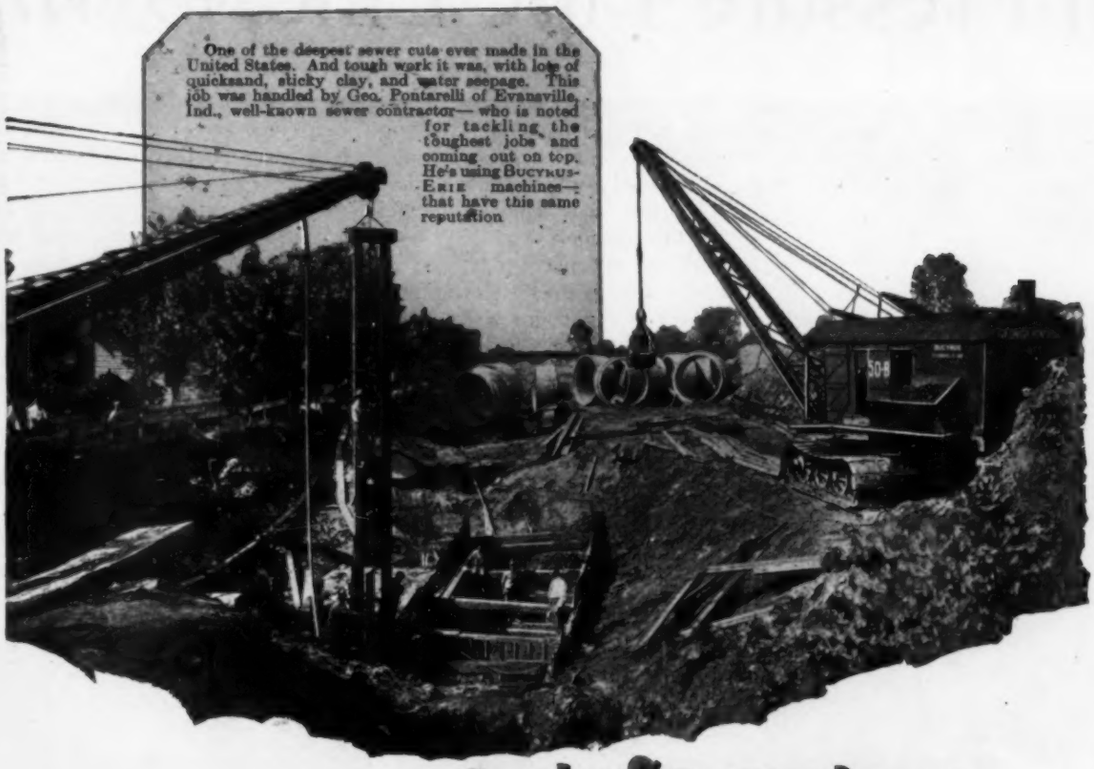
BUCYRUS-ERIE COMPANY

South Milwaukee, Wis. Erie, Pa. Evansville, Ind., U. S. A.

BUCYRUS ERIE

A Union of Strength

"BUCYRUS" and "ERIE"— each the most successful manufacturer in its particular field— consolidated Jan. 1, 1928. The unmatched resources of BUCYRUS-ERIE assure the buyer of Unequalled Value, More Efficient Machines, Permanence of the Manufacturer, and a More Complete Field Service.


One of the deepest sewer cuts ever made in the United States. And tough work it was, with lots of quicksand, sticky clay, and water seepage. This job was handled by Geo. Pontarelli of Evansville, Ind., well-known sewer contractor— who is noted for tackling the toughest jobs and coming out on top. He's using Bucyrus-Erie machines— that have this same reputation

The most severe test of a contractor— the tough job that "makes or breaks"

Any contractor with "a pencil and a bond" can complete the easy excavating jobs with a nice run of soft material. No special ability or experience needed— and any kind of equipment can dig it.

But the real tough jobs— with hard rock or sticky clay— quicksand, cave-ins, water gushing down into the hole— these are the jobs that "make or break."

And the contractor whose courage is backed up by genuine ability, makes money on these "Jonahs"— gains profit and reputation where another contractor would be picked as "clean as a whistle." One big advantage that the successful contractor has: "He's learned to use equipment with the sturdiness to slash its way through."

Which explains why the BUCYRUS-ERIE 50-B is such a favorite of contractors with a reputation for success. On the tough contract, this 2-yard shovel bites in, and tears through. It is built with extra strength— it is a sturdier machine. from truck frame to boom and dipper. It stands up under a steady diet of the hardest rock work.

This fast 2-yard shovel will give you big output on any job you put it to.

You can get this reliable BUCYRUS-ERIE equipped for shovel, dragline or crane work— or all three. And with your choice of Diesel, Steam or Electric power.

BUCYRUS-ERIE COMPANY

Plants: South Milwaukee, Wis., Erie, Pa., Evansville, Ind., U. S. A.

General Sales Offices: South Milwaukee, Wis., Erie, Pa., U. S. A.

BUCYRUS ERIE

Branch Offices:

Boston	Atlanta	Buffalo	St. Louis
New York	Birmingham	Detroit	Dallas
Philadelphia	Pittsburgh	Chicago	San Francisco

Representatives throughout the U. S. A. and Canada

Offices and agencies in all the principal countries throughout the world

High Pressure Pipe Line, *45 Miles*

A 45-MILE pipe line, 7 in. in diameter, with 11,000 joints made in the field by the electric-arc welding process, now carries gas, under pressure ranging from 600 to 1,000 lb. per square inch, between Lamkin, La., and the plant of the Advance Bag & Paper Co. at Hodge. With a bid of $1.25 per joint, the Big Three Welding and Equipment Co., of Houston, Texas, obtained the job and sent into the field five portable Lincoln stable-arc welding machines operated by Buda gasoline engines. Each welding crew consisted of four men who welded simultaneously four consecutive joints and then moved on along the line. The lengths thus formed were later joined by a bell-hole operator. The line was completed and tested in 5-mile stages.

The welding machines operated at from 175 to 200 amperes and 18 volts; the metallic rod electrodes were $\frac{5}{16}$ in. in diameter. The joints were made in two layers.

The route of the pipe line was through rugged, hilly country, with one river crossing. As shown in the illustrations, the welding was done with the pipe supported by logs over the trench, into which it was lowered, after testing, and then backfilled.

COMING: Building the big trussless wooden roof for the Democratic Convention Hall at Houston, Tex.

PONTOONS (*right*) carried the pipe across the Ouachita River while being lowered to place in 36 ft. of water.

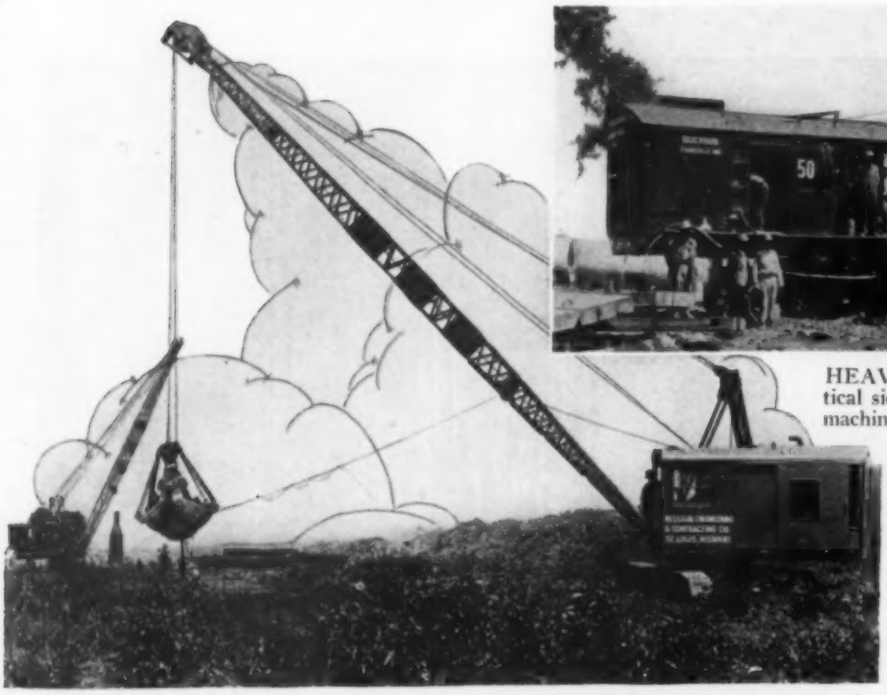
PORTABLE WELDING MACHINE (*above*), driven by gasoline engine, operated at 18 volts and from 175 to 200 amperes.

AT RIVER CROSSING heavy cast-iron sleeves were bolted on to the pipe to weight it down and hold it in place when submerged. Cable from drum on tractor pulled pipe into position.

in Length, Has Arc-Welded Joints

SECTION OF 45-MILE WELDED PIPE LINE showing portable electric-arc welding machine and operator in dugout hole at work on a bell-hole joint. Welded joint (*in circle*) with metallic electrode and holder on top of pipe; note ripples in weld resulting from semi-circular motion of arc

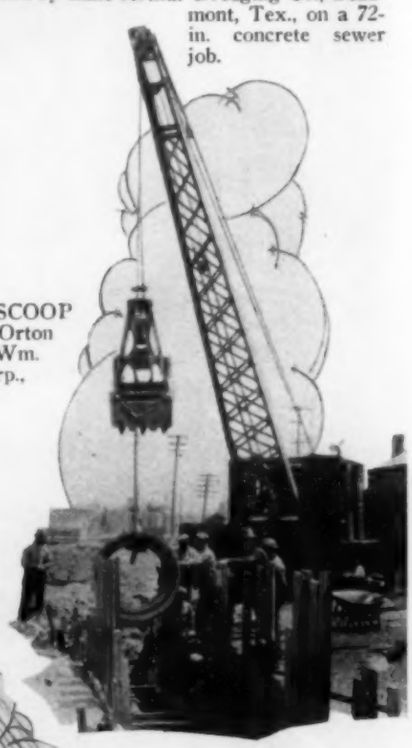
TRENCHING METHODS AND MACHINES, Showing



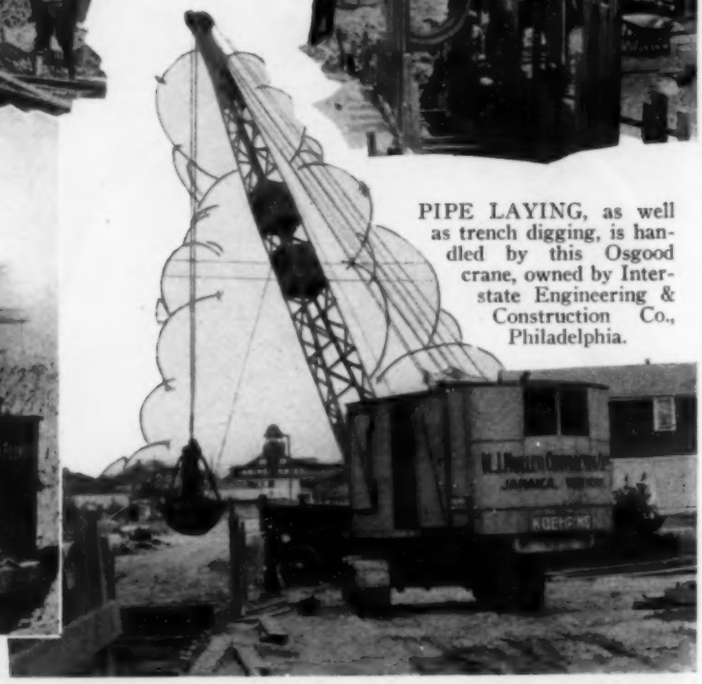
HEAVY TRENCHING with sloping instead of vertical sides, offers field for dragline. Here's a Bucyrus machine operated by Lake Arthur Dredging Co., Beaumont, Tex., on a 72-in. concrete sewer job.

CLAMSHELL BUCKET *(above)* on Northwest crane excavates St. Louis water-works conduit ditch for Missouri Engineering & Contracting Co.

DITCHER SCOOP *(left)* on Orton crane used by Wm. Bailey Corp., Rochester, N. Y.



PIPE LAYING, as well as trench digging, is handled by this Osgood crane, owned by Interstate Engineering & Construction Co., Philadelphia.



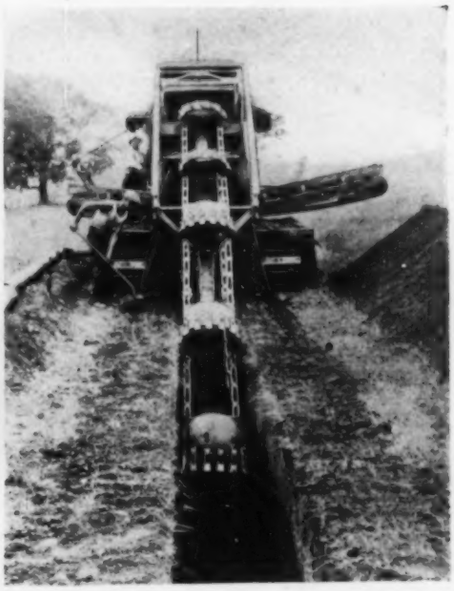
TEAMWORK on trench excavation for large sewer in Buffalo, N. Y., by Pittsburgh Foundation Co. Marion shovel digs to grade, and lifts spoil to bank for rehandling by crane and clamshell rig.

ORANGE PEEL BUCKET on crawler-mounted Koehring locomotive crane works well for H. J. Mullen Contracting Co., Jamaica, N. Y., where digging space is restricted by trench sheeting.

Standard Equipment on Water-Works and Sewer Jobs

VERTICAL DITCHER, a Barber-Greene Machine excavated 30,000 lin. ft. of main trench 30 in. deep at Thomasville, Ga., at average cost, reported by D. R. Pringle, supt. of Water & Light Dept., of 4½ cents per linear foot, including maintenance and overhead.

DRAG SHOVEL *(below)*, a new product of the Page Engineering Co., speeds excavation on Lyons, (Ill.) sewer job by Frank Piacenti, contractor.



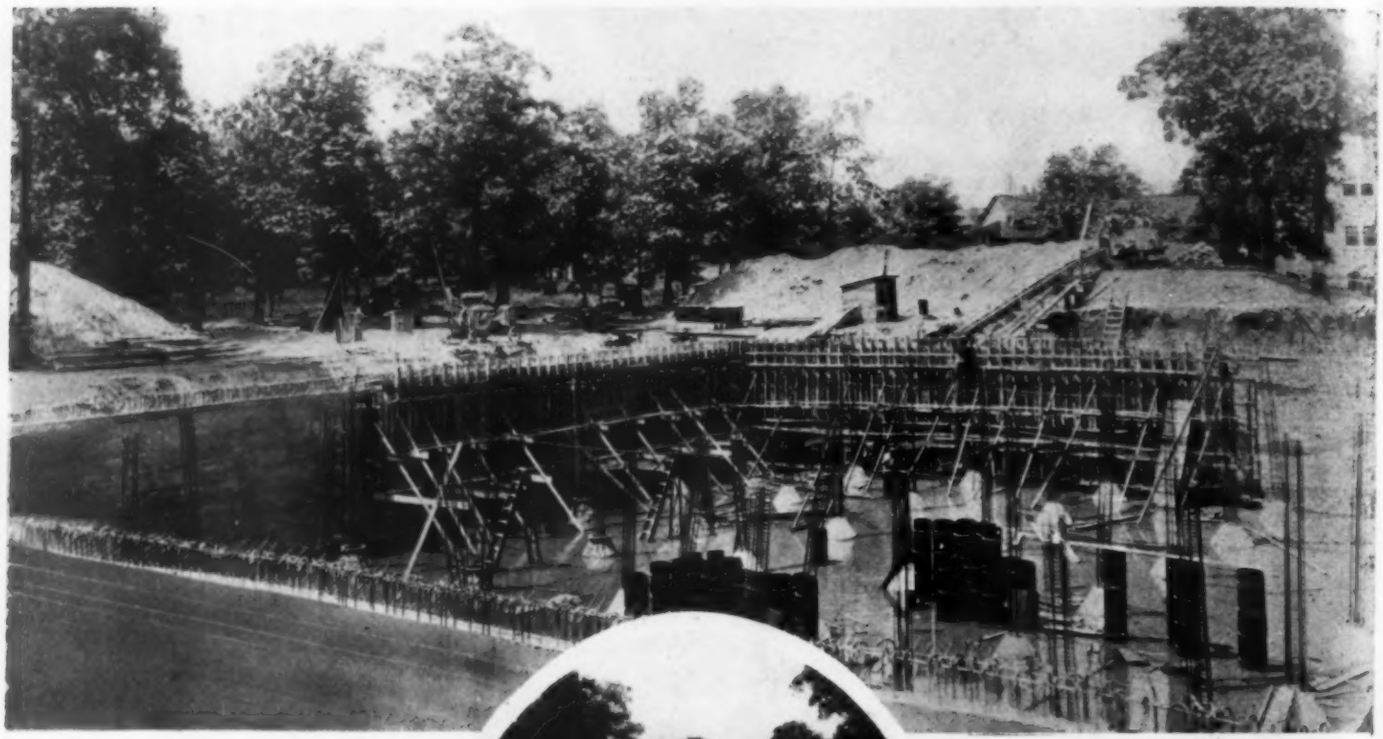
MACHINE TRENCHING with an Austin outfit owned by C. A. Daley, contractor, of Waukesha, Wis. The ditch shown, 28 in. wide and 6 ft. deep, is for a new water main.

LADDER TYPE TRENCHER, from Harnischfeger Corp. shops, used by Nick Tomaro, of Cudahy, Wis., for cuts 15 ft. deep and 22 to 42 in. wide.

BACKFILLING adjacent sewer and main trenches with a Parsons machine operated by F. F. Fry, Ltd., Toronto. The trenches are only 2 ft. apart and were dug with Parsons trench excavators.

BACK-HOE DITCHER attachment on a Byers excavator digging sewer trench through stratified sandstone for E. P. Langenhan Co., Cleveland.

Combat Ground Water *to Build Reservoir*



GROUND-WATER level 12 ft. above the bottom of the finished structure forced the Merkle Construction Co., of Kansas City, Mo., to adopt special tactics in building a 1,500,000-gal. covered concrete receiving reservoir for the City of Elkhart, Ind. As designed by the Burns & McDonnell Engineering Co., of Kansas City, consulting engineers, the reservoir is 111 ft. square inside and 15 ft. deep; the roof and floor are of flat-slab construction, supported by columns on 15-ft. centers. The work called for 1,240 cu.yd. of concrete and 220,000 lb. of reinforcing steel.

With a steam crane and clamshell bucket the contractor excavated the foundation in sand and gravel, carrying the banks down at a ¾ to 1 slope. To hold the material from running in the water-bearing material, logs were held at the toe of the side slopes by long stakes and sand bags were placed against the slopes, above these logs, to a height of 7 ft.

To keep the ground water level down, an 8-in. centrifugal pump with a capacity of 1,600 gal. per minute and a 6-in. centrifugal handling 1,200 gal. per minute, were installed at suction wells and operated intermittently day and night. As most of the ground water seeped in from the sides, planks were laid along the outside footing line forming a channel around the reservoir which intercepted the water and carried it to the pumps. This method of dewatering, according to T. R. Haseltine, resident engineer in charge of the work for the consulting engineers, made it possible to deposit the floor concrete almost entirely in the dry.

CONSTRUCTING CONCRETE RESERVOIR at Elkhart, Ind., showing *(in upper picture)* set-up of inside wall forms and column bases; and *(in oval)* chutes for concreting and sand-bag revetment for holding banks from slipping in water-bearing material.

Floor concrete was spouted to place from three one-sack mixers on the bank. Two pounds of Celite per bag of cement were used in all concrete in the floor and walls to decrease trouble encountered in using concrete spouts on flat slopes with dry mixes.

No trouble was caused by water boiling up through the freshly placed floor concrete until the last 8 hr. of the run. Up to this time concrete had been run with a cement to water ratio of 1.1 and a slump of 7 in. When the ground water began to give trouble, the cement to water ratio was raised to 1.65, giving a slump of 2 in. In spite of this precaution it was impossible to prevent one water boil through the floor. After the concrete set, this boil was confined to a ¾-in. pipe which was later plugged.

In pouring the walls the inside forms were built to full height and the outside forms only halfway up. This method insured more efficient rodding of the concrete.

NEXT MONTH: Building the Tamiami Trail Highway across the Florida Everglades

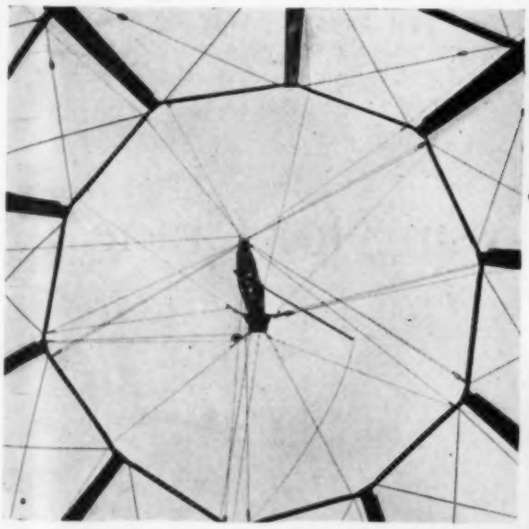
"IRON SHEEP," with Caterpillar tractor in role of shepherd, tamping down the earth fill for the Lafayette dam which the George Pollock Construction Co., of Sacramento, is building for the water supply of Oakland, Calif., under the direction of Chief Engineer Arthur P. Davis of the East Bay Municipal Utility District. The cylindrical rollers with their projecting "feet" are known as Rohl tampers.

OVER THE TOP! When the Wanaque dam of the North Jersey District Water Supply Commission was finished there were no exit gaps through which to remove a pair of 70-ton Bucyrus steam shovels. Harking back to his days of service in France with the A. E. F., Major Arthur H. Pratt, chief engineer, commanded "Over the Top." Like good soldiers both shovels made the grade along an inclined track from base to crest of the structure.

JOB ODDITIES

A Monthly Page of Unusual Features of Construction

BASEBALL SEEMS TO BE the motif influencing the design of this 100,000-cu.ft. Hortonsphere for the Portsmouth (Va.) Gas Co. Even Babe Ruth would have a hard time hitting this one out of the lot. It's 45 ft. in diameter and comes from the shops of the Chicago Bridge & Iron Works.

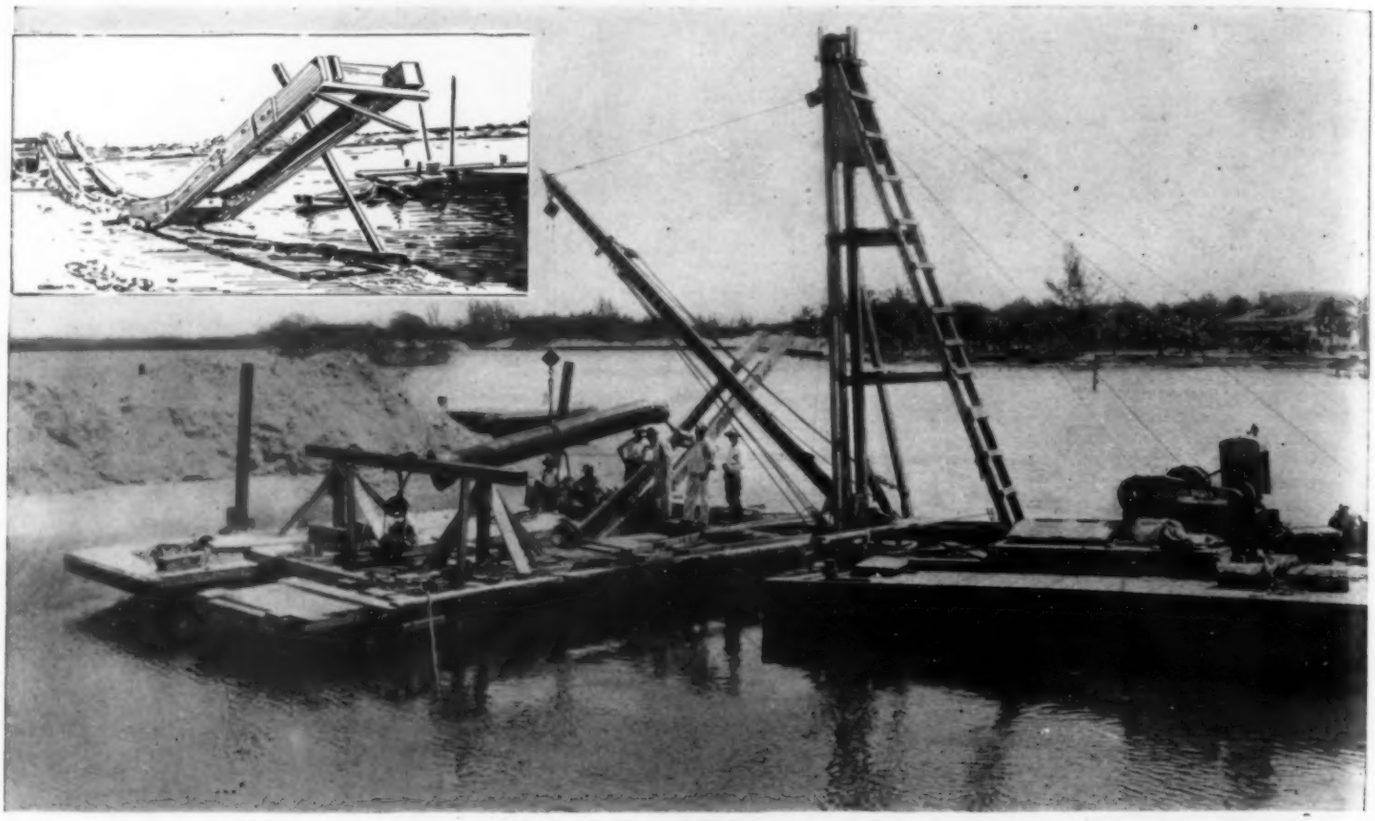


LOOKS LIKE A SPIDER WEB, but it's just a derrick mast suspended by cables to erect the upper portion of one of the Pittsburgh-Des Moines Steel Company's elevated water tanks at Hempstead, N. Y. Other pictures on this job on page 14.

If there's anything odd on *your* work, mail the Editor a snapshot of it.

SHOO, SEA GULLS! The Spring Valley Water Co. of San Francisco found it impossible to rid its reservoirs of flocks of unwelcomed feathered visitors until it strung lines of No. 9 galvanized wire in 50-ft. squares 1 ft. above water level. These wire nets are effective in scaring off the gulls which paid slight attention to an automatic gun detonating at regular intervals, previously installed to "police" the reservoirs and prevent contamination by the birds.

Cradle Aids Laying of Submarine Pipe Line

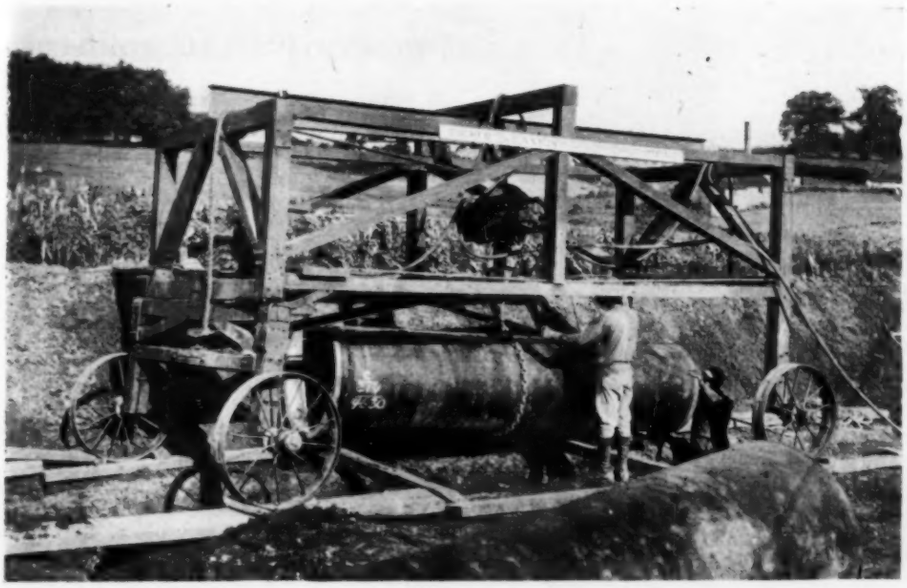


When the engineering firm of Solomon, Norcross & Kies, of Atlanta, Ga., was called upon to lay a 16-in. water main under Las Olas Sound at Fort Lauderdale, Fla., this cradle, supported between two barges, handled the job effectively. Joints were calked above water level, and as the scows were moved ahead, the pipe slid along the cradle to place in a dredged trench, 15 ft. below water level. Sketch in insert shows pipe cradle details.

Trench Spoil Forms River Crossing for Crane

Here's an Insley excavator that didn't even get its feet wet while digging a trench for a 24-in. gas main across the Miami River at Hamilton, Ohio. It bridged the stream with spoil it dug from the trench and later backfilled the material over the completed gas main. The Richter Transfer Co. was the contractor.

Prize Winners in Photographic Contest



First Prize
$25.00

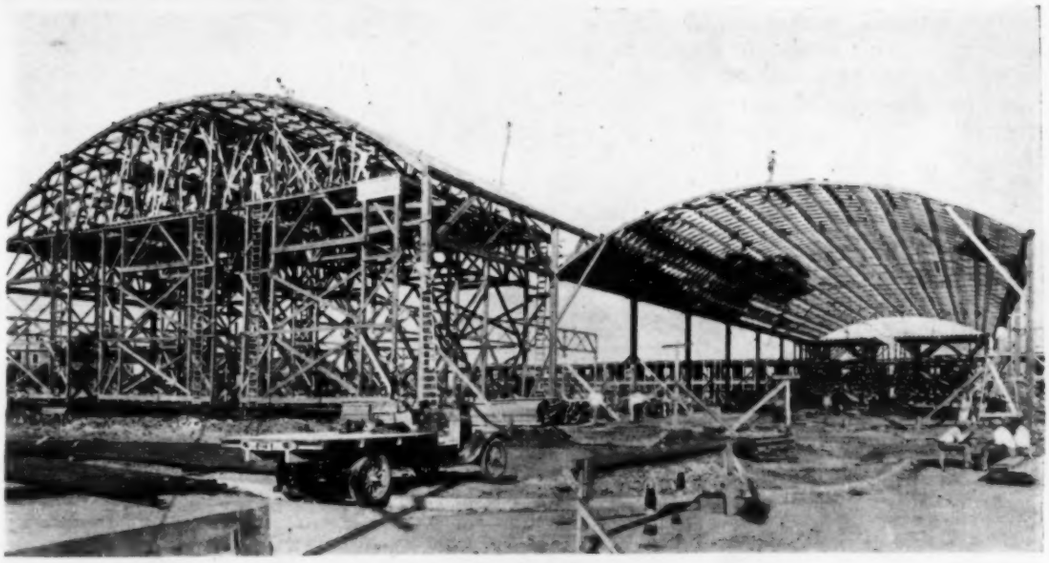
Won by E. L. SCRUGGS
Tucker & Laxton, Inc.,
Charlotte, N. C.

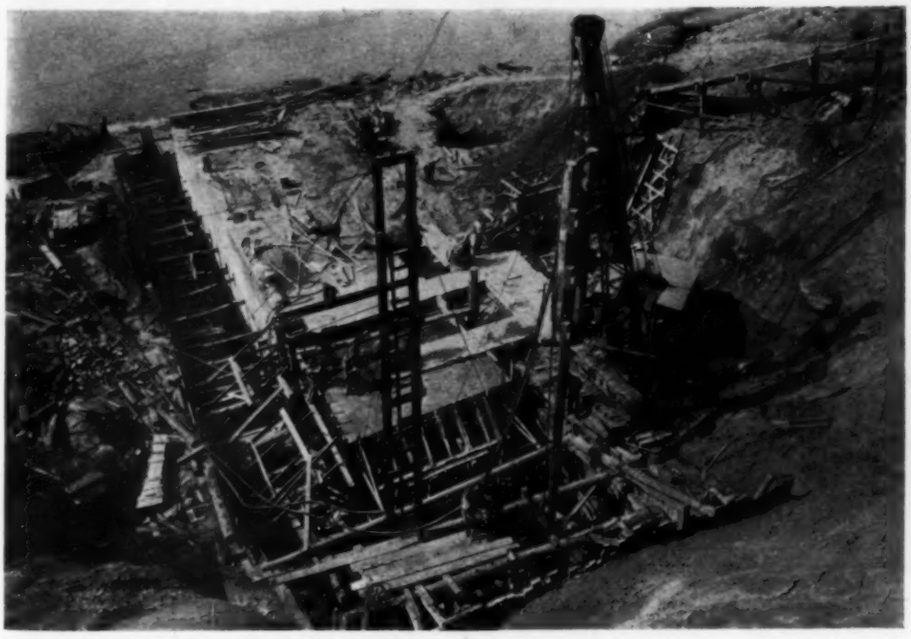
PIPE HANDLING WAGON with wheel mounting that can be steered to follow line of trench. A 5-ton Ingersoll-Rand air hoist on overhead I-beam runway lowers 30-in. cast-iron pipe sections; air-operated tugger pulls wagon ahead.

Second Prize
$15.00

Won by
R. E. TURRENTINE, Jr.
Lamella Trussless Roof Co.
Houston, Texas

BUILDING THE HALL for the Democratic National Convention at Houston, Tex. Special scaffold of five platforms on railroad car wheels aids erection of 80,000 sq.ft. of Lamella trussless timber roof in 22 days—center span 120 ft., and side spans 76 ft. each.





Third Prize
$10.00

Won by L. E. HOMER
Superintendent, W. H. Shons Co.,
Freeport, Ill.

SEWER OUTLET 16 ft. square in cross section and 140 ft. long constructed within cofferdam in water-bearing sand at Huling Ave., Memphis, Tenn., to replace 16-ft. circular pipe destroyed by settling 10 ft. during Mississippi floods of 1927. Job required jetting and driving of 14,000 ft. of 45-ft. timber piles.

BIG STEEL PIPE *Links*

Tallassee project in North Carolina uses on route requiring tunnels and 163 ft. high

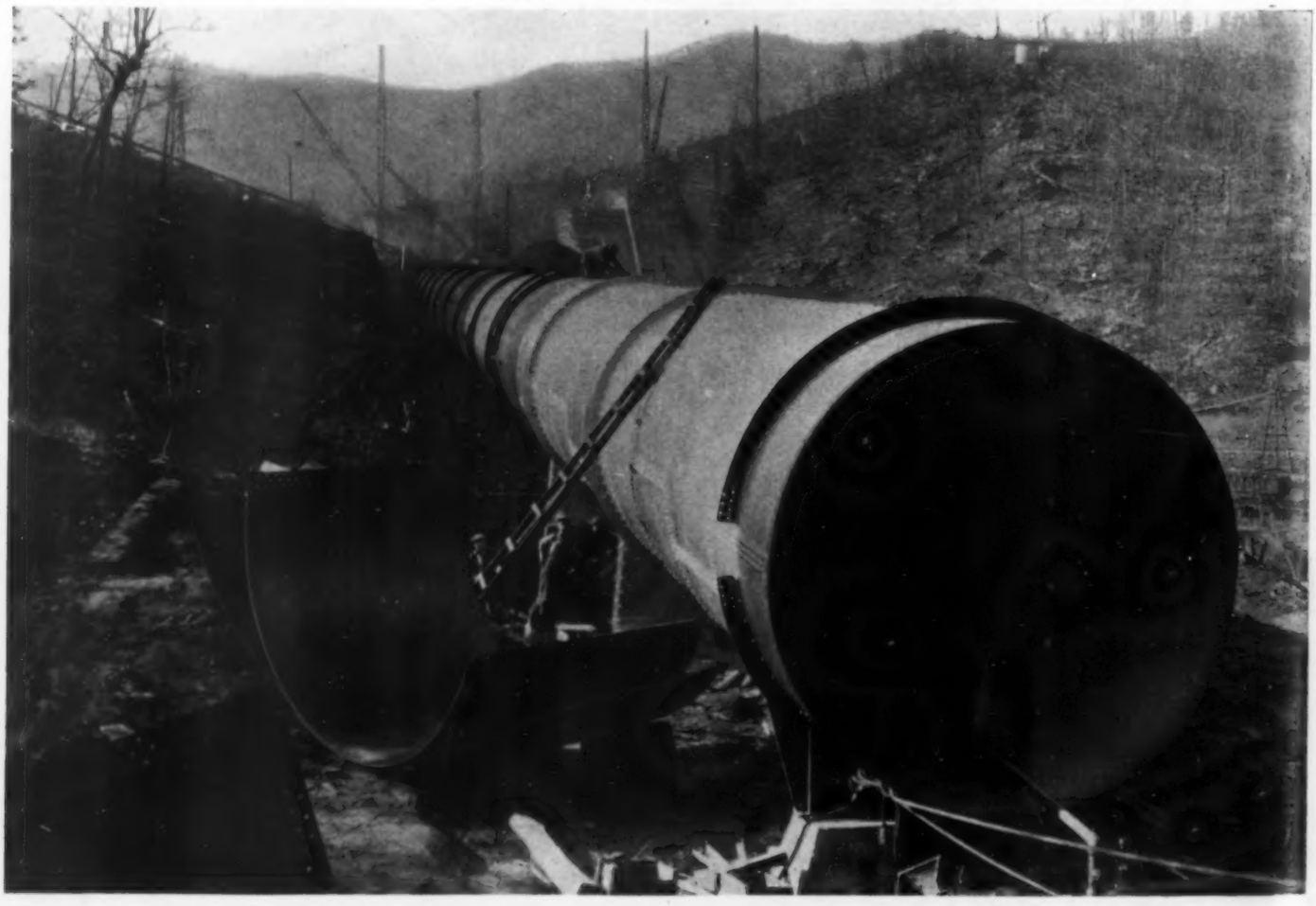
ALONG a route involving several tunnels and river crossings, the Chicago Bridge & Iron Works has fabricated and erected for the Tallassee Power Co., in North Carolina, 8,600 ft. of 11-ft. diameter riveted steel pipe and a huge surge tank of steel plate 32½ ft. in diameter and 163 ft. high. This construction is part of an $8,000,000 project for developing the water power of the Little Tennessee River and its tributaries at Santeetlah, N. C.

Plates from ⅜ to 1 1/16 in. thick, the heavier ones having triple riveted butt-strap joints, form the steel sections of the conduit. Where the pipe passes through tunnels, it is assembled in 45-ft. sections outside, skidded into place and then welded to the line on the inside. The space between the pipe and the tunnel section is filled by grouting. The tunnels are very little larger than the pipe, making it impossible for the joints to be riveted with the plates in place.

LAYING THE BOTTOM HALF of the big 11-ft. diameter riveted steel pipe line between tunnel sections.

Upon delivery at the site, the steel plates are raised to position for bolting, reaming, riveting and calking by a derrick that travels directly on top of the pipe already in place. The derrick is moved along 30 ft. at a time by a hand crab; its boom is swung by a hand winch and the boom and fall lines are operated by two small air hoists.

The pipe line is supported at 30-ft. intervals on steel cradles and reinforced every 30 ft. with stiffeners, as shown in one of the illustrations. At ravines the supports are structural steel bents from 12 to 50 ft. high. Where the pipe runs parallel and close to the ground, however, the cradles are short plate and structural steel saddles rest-



SUPPORTED ON CRADLES at 30-ft. intervals, the pipe section is built up of ⅜ and 1 1/16-in. steel plates with triple riveted butt-strap joints. Stiffeners reinforce the pipe every 30 ft.

Dam and Power House

riveted conduit 11 ft. in diameter river crossings—surge tank a feature

SURGE TANK, of riveted steel plate, is 32½ ft. in diameter and 163 ft. high.

ing on concrete piers. At two crossings over the Cheoah River the saddles are mounted on plate girder bridges resting on concrete piers. At each bend or change of direction the pipe is anchored in concrete. Expansion joints in the line are of the slip type built of structural steel with sliding surfaces of Monel metal for protection against rust.

The surge tank, of the Johnson differential type, 32½ ft. in diameter and 163 ft. high, is built at the end of the 11-ft. pipe line just as it emerges from the last tunnel. The T in the pipe line underneath the surge tank has a 9-ft. vertical section terminating at the base of the tank. A 7-ft. downcomer is set over this 9-ft. opening and extends to the top of the tank. The 1-ft. space around the downcomer at the bottom is partially closed with concrete, leaving ports to feed water back into the line. A Y, just below the surge tank, provides two 8-ft. branches from the 11-ft. pipe line. The inside of the pipe and surge tank were given two coats of red lead in the field. The outside surfaces received one coat of red lead and two coats of aluminum paint.

For the portion of the work handled by the Chicago Bridge & Iron Works, the foremen in charge of operations in the field were S. C. McCloud and S. Anderson; they had an average crew of 80 men on the job while work was in full swing.

RIVER CROSSINGS required the construction of plate-girder bridges on concrete-piers. Saddles support the pipe on the bridge structure.

Well Points *Aid Sewer Job*

Keep Trench Dry for Laying and Jointing Vitrified Pipe

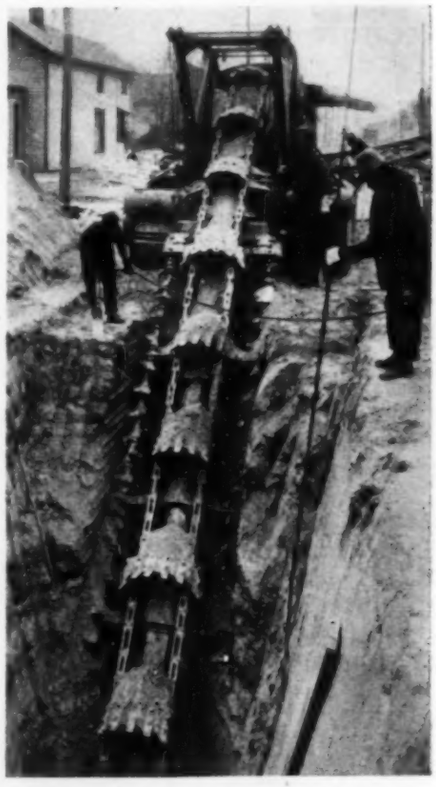
WELL points connected through hose lines and piping to a pair of Barnes pumps, kept the trench dry while Charles B. Ramsey, contractor, of Topeka, Kan., laid 47,000 lin.ft. of vitrified clay sewer pipe at Topeka under the direction of W. E. Baldry, city engineer.

The route of the sewer extended through sandy material, with the bottom of the trench well below water level in the river nearby. Light skeleton sheeting and bracing were put in to hold the trench sides secure while the pipes were being bedded and jointed.

In supplying the sewer pipe for the job the W. S. Dickey Clay Mfg. Co., of Kansas City, Mo., shipped 7,000 lin.ft. for the trunk line, ranging in diameter from 21 to 36 in., and 40,000 lin.ft. for the laterals. The removal of the ground water in the trench by the well-point system made it possible for the contractor to install the pipe with accuracy and speed and to satisfy the demands of the city's engineering department that joints be carefully made and bells completely filled with mortar after bedding the pipe precisely to grade.

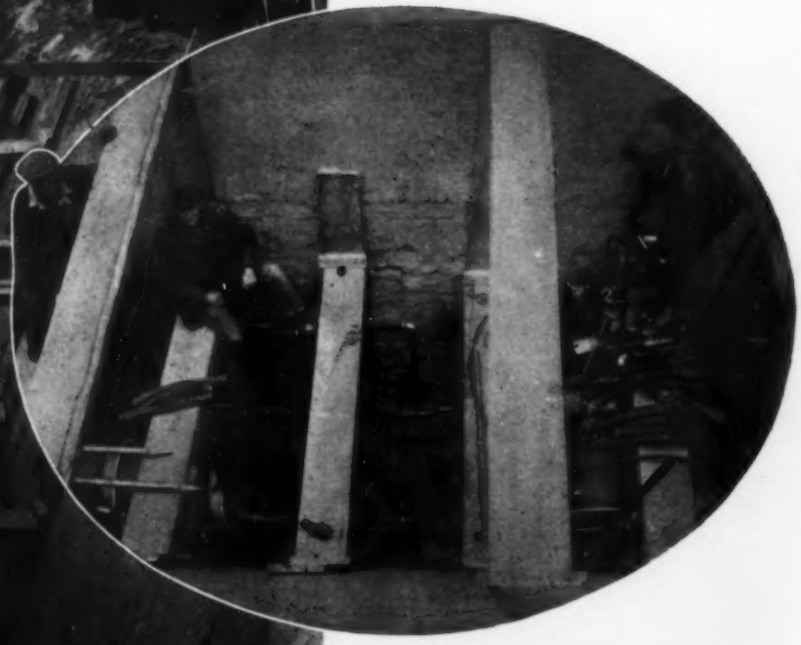
For handling the trench excavation the contractor set to work two Buckeye ditchers, a Koehring drag-line, and two pull-shovels, a Keystone and a Bay City. Commenting on the results secured in keeping the trench free of water with the well-points, J. E. Kirkham, speaking for the contractor, said:

"The well-point system is thoroughly

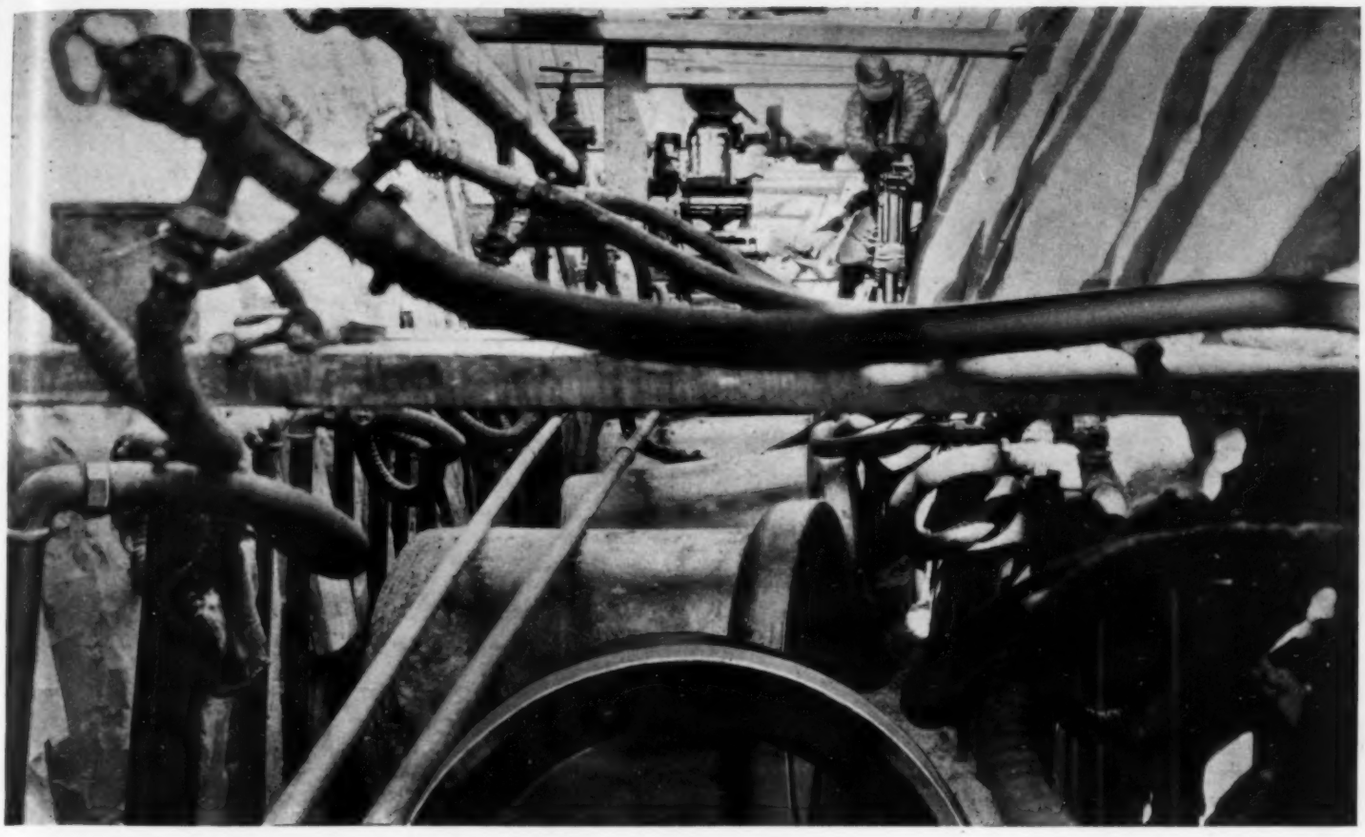


TAKING OUT the trench 18 to 22 ft. deep with a ditcher equipped with side-cutters.

SKELETON SHEETING, consisting of lagging timbers spaced several feet apart and braced by horizontal struts, held the banks when the ground water level was lowered.



DRIVING well-points into water-bearing sand with air hammer; hose couplings ready for attachment to pipe.

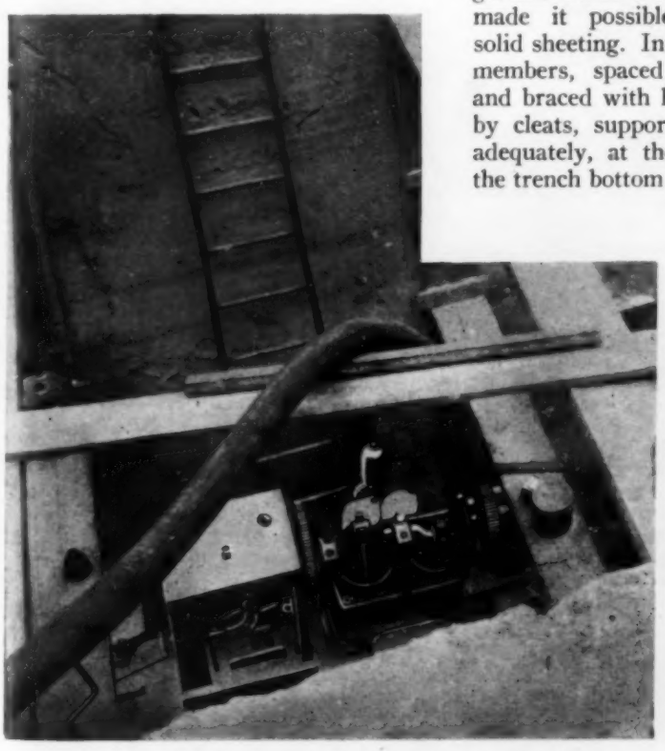


HOSE COUPLINGS hooked up to the pipe lines leading to the pump, which is located on a platform above the sewer pipe.

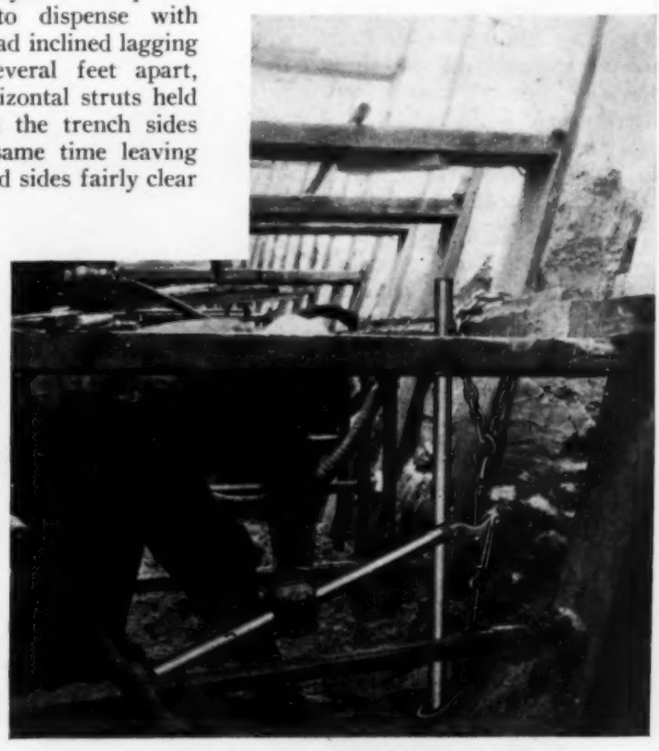
practical where the percentage of silt is not too high. For most of the 7,000-ft. length of sewer on which the big sizes of pipe were laid the depth of the trench ranged from 18 to 22 ft. and the head of water was as much as 8 ft. The job was completed in 7 months."

From the accompanying photographs it will be noted that the reduction of the ground water level by the well-points made it possible to dispense with solid sheeting. Instead inclined lagging members, spaced several feet apart, and braced with horizontal struts held by cleats, supported the trench sides adequately, at the same time leaving the trench bottom and sides fairly clear for driving and pulling well-points.

The pumping units, hooked up by pipe line and hose couplings to the well points, were mounted on platforms on the trench timbering.



PUMP mounted on elevated platform carried by the timbering above the trench bottom. In this location it is out of the way of the pipe-laying crew.



LIFTING the well-points after sewer pipe is laid and jointed. Sides of ditch were hand trimmed before bracing was set.

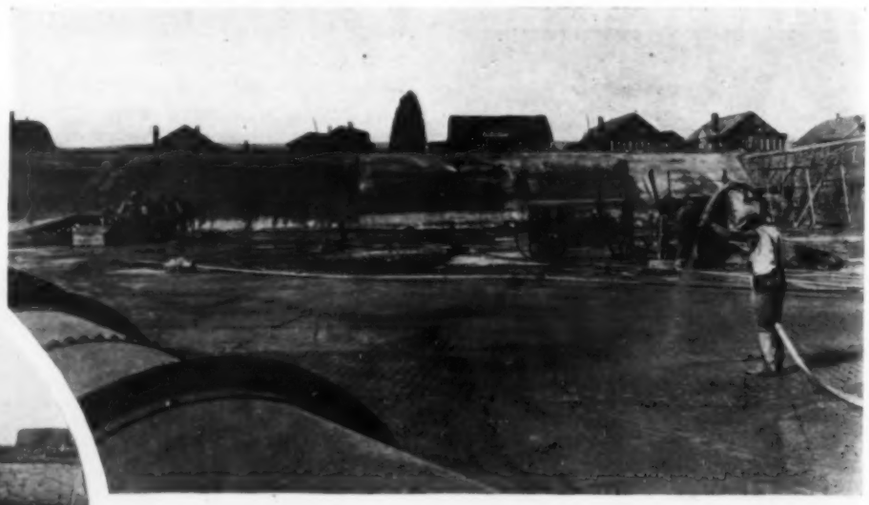
INCLINED CHUTE delivered concrete to trucks for 6-in. floor slab in south basin.

Gunite Lining Tightens Reservoir

THE 2-in. lining of 1 : 2½ cement-sand Gunite applied by the Rust Engineering Co., of Pittsburgh, to the floor and walls of the 30-year old Payson Park reservoir of the Cambridge (Mass.) water-works, has proved effective in stopping a daily leakage of 500,000 gal. The reservoir, with a capacity of 43,000,000 gal., is divided into a north and south basin by a dividing wall. The floor, as originally laid, was of concrete while the sloping side walls were lined with brick in natural cement mortar for the lower 15 ft. and with granite blocks for the top section. The reconditioning job involved a total of 373,383 sq.ft. of lining at a cost of $131,000.

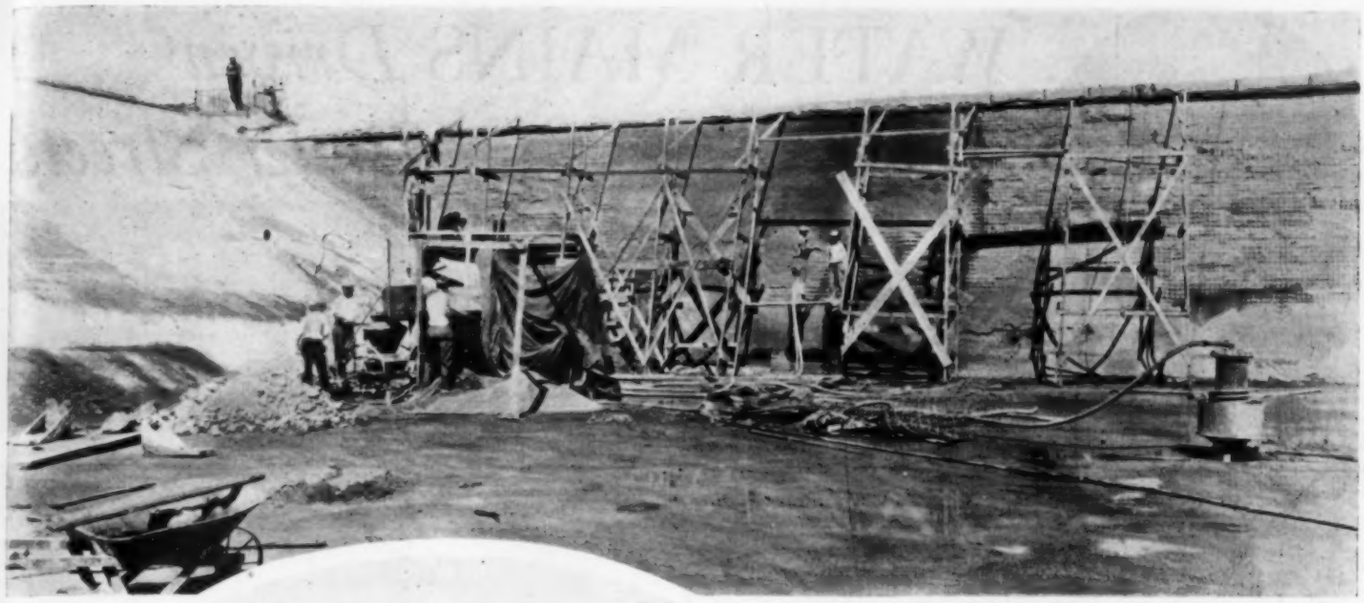
Prior to undertaking the lining operation, the contractor replaced the old floor of the south basin with 6 in. of 1 : 2½ : 4 concrete; the north basin floor, however, was in good enough condition to receive the new lining. Concrete for the south basin floor slab was mixed in a Ransome machine located outside the reservoir, discharging into a skip car on an inclined track over the embankment. From a hopper and chute on the other side Ford trucks delivered the mixed concrete into place on the floor.

Cement gun lining operations were served by air compressor equipment



APPLYING GUNITE lining (*above*) over wire mesh reinforcement on reservoir floor. A total of four Cement Guns was used, supplied with air from three stationary and one portable compressor.

REMOVING the old asphalt lining which had been laid over the original concrete floor.



COATING the vertical face of the division wall between the north and south basins.

CONCRETE MIXING PLANT (*above*) with skip and inclined track on reservoir embankment.

consisting of one portable and three stationary units having a total capacity of 1,500 cu.ft. of free air per minute. In addition, a 118-cu.ft. compressor supplied air for drilling holes for anchoring the wire mesh reinforcement. Dry cement and sand were fed into a Kent continuous mixer delivering onto an inclined belt conveyor extending up over the reservoir embankment to a point of delivery into a chute and hopper; from the hopper Ford trucks took the mixture to the cement gun machines.

The layout, as originally planned, contemplated the use of one central point from which material would be fed to the four guns from an elevated platform. It was found, however, that with this layout the air pressure at the nozzles was too low, due to the long run of hose required. Accordingly, small hoppers were built for each gun and the material shoveled into them by hand.

It was found to be best practice to shoot at least 3 or 4 ft. of slope or wall integrally with the floor, to avoid laps at joints where wall and floor meet. The vertical dividing wall was shot from the bottom up. Curing was done with burlap kept moistened for 96 hours.

The work was carried on under the direction of Lewis M. Hastings, city engineer of Cambridge, Mass.

PIPING had to be disconnected and shifted during operations on the floor lining. The entire job involved the shooting of 373,383 sq.ft. of 2-in. Gunite surfacing.

WATER MAINS *Driven Under Streets*

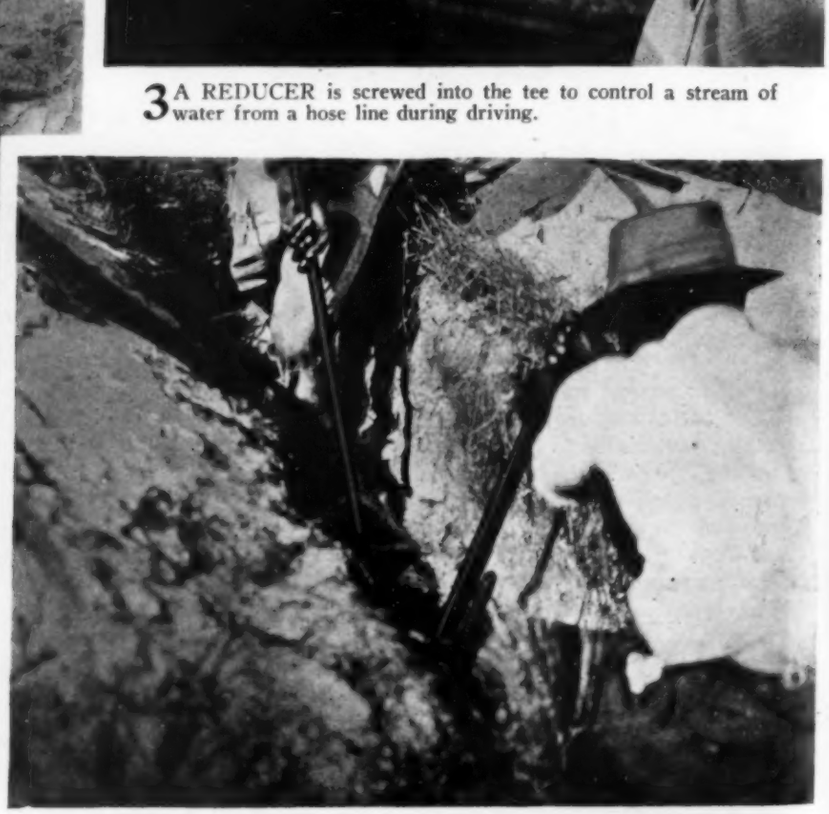
William Rimele, foreman, service, department, West Palm Beach (Fla.) Water Co.

1 SERVICE TRUCK of West Palm Beach (Fla.) Water Co. delivers pipe and tools for extension to a 2-in. pipe under street.

2 A TEE is connected to the pipe to be driven using vise on end of service truck.

3 A REDUCER is screwed into the tee to control a stream of water from a hose line during driving.

4 WITH HOSE CONNECTION made *(above)* the pipe is laid in the trench ready for driving.



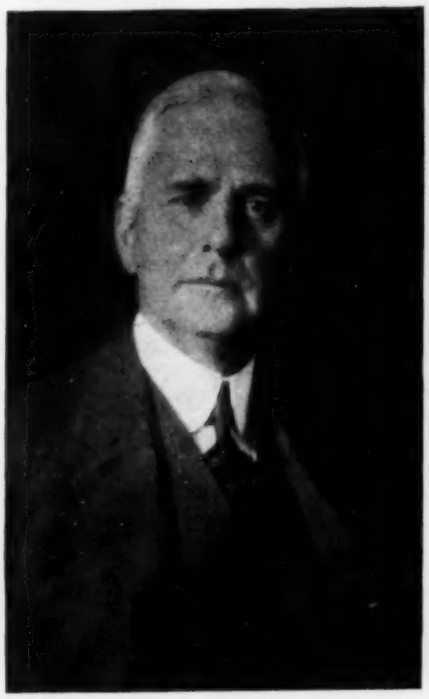
5 WITH BAR and pipe wrench *(right)* the pipe is forced through the sand. A maul is used only when necessary.

Present and Accounted For —

A Page of Personalities

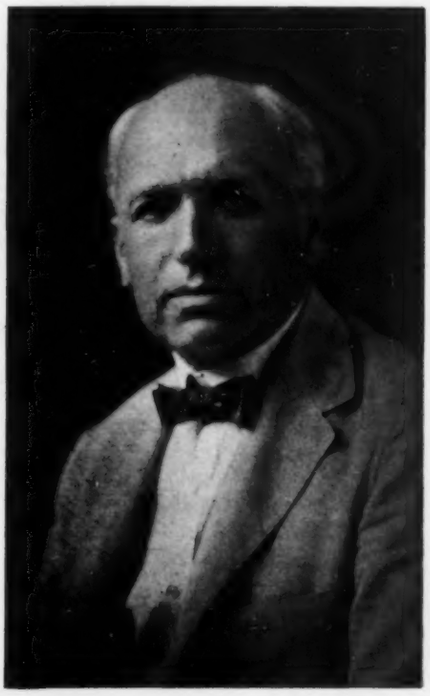
Incoming President, A.W.W.A.

WILLIAM W. BRUSH, who takes office as president of the American Water-Works Association at that organization's annual convention in San Francisco this month, is chief engineer of the Department of Water Supply, Gas and Electricity of the City of New York. With a background of 34 years of experience in the city's water department, which he entered as chainman in 1894, after graduation from New York University, Mr. Brush is generally regarded as one of the country's foremost water-works engineers and executives.



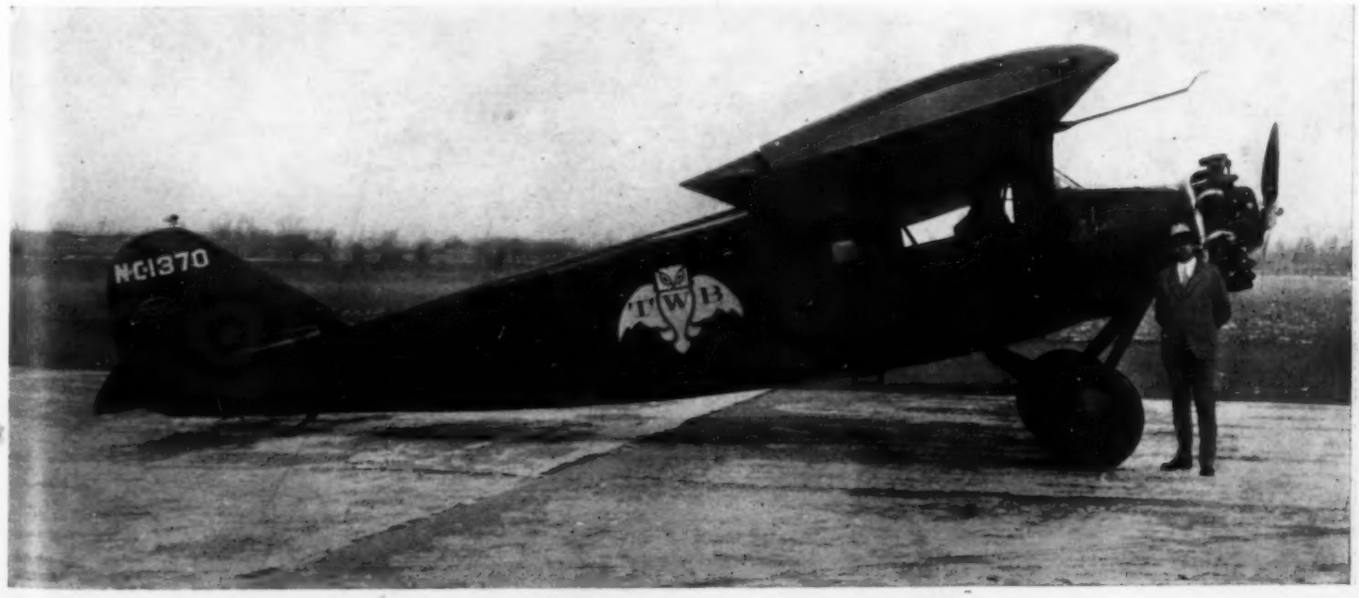
Opens Paris Office

MAJOR JAMES F. CASE, recently appointed by Stone & Webster, Inc., to establish an office in Paris for that organization, has had a broad engineering and construction experience in this country and in foreign lands. His previous connections include the Cuban Engineering & Construction Co., the American International Corporation, and Ulen & Co. In 1926 he reported on transportation in Poland for the League of Nations.



Past-President, A.W.W.A.

J. E. GIBSON, who turns over the presidency of the American Water-Works Association to William W. Brush this month, is manager and engineer of the Water Department of Charleston, S. C., a position which he assumed in 1917, after service for a number of years as principal assistant engineer of the American Pipe & Construction Co., of Philadelphia. Mr. Gibson is a graduate of the University of Arkansas ('94).



Uses Airplane in Construction Equipment Business

C. H. KELLER, president, Contractors Equipment Co., Detroit, uses airplane for traveling 20,000 miles a year in the conduct of his business. He alternates with his mechanician in piloting the plane; when not at the "stick" he disposes of his correspondence with a dictaphone.

Building a District
To Serve Nine

UNDER the administration of Arthur P. Davis, chief engineer, the East Bay Municipal Utility District, at Oakland, Calif., is speeding the construction of a $39,000,000 system to collect and deliver water from the Mokelumne River to nine cities along the east shore of San Francisco Bay. The works comprise the Pardee reservoir and dam at Lancha Plana, 360 ft. high and containing 600,000 cu.yd. of concrete, an aqueduct 93.8 miles long, mostly of steel pipe from 61 to 65 in. in diameter, two pumping plants, an intermediate storage reservoir formed by the Lafayette earth-fill dam and three additional regulating reservoirs.

In the main aqueduct line there are four tunnels, aggregating 9.1 miles in length, a 3.5-mile section of 9-ft.

ROCKRIDGE SIPHON, twin lines of 54-in. lock-bar pipe 1,224 ft. long, fabricated and installed by Western Pipe & Steel Co. The 30-ft. sections are tapered for field connections by double-riveted lap joints, with butt-strap joints at curves.

SPREADING AND CONSOLIDATING the earth fill for the Lafayette dam. Caterpillar tractors hauling Adams and Galion blade graders spread the material prior to compacting with a Rohl cylindrical tamper with "sheep's-foot" spikes.

LAFAYETTE DAM SITE, showing excavation for puddle core and trench for outlet pipe. The embankment requires about 2,000,000 cu.yd. of rolled earth fill.

Water Supply System

California Cities

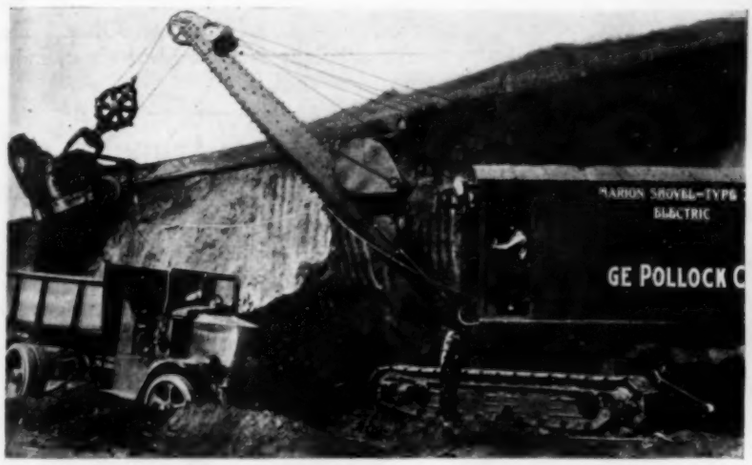
reinforced-concrete conduit, and 81.2 miles of steel pipe.

For the Lafayette dam, the George Pollock Construction Co., of Sacramento, is making the earth fill with material excavated by power shovels and draglines, delivered by motor truck, spread by blade graders, and consolidated with tractor-hauled cylindrical rollers studded with "sheep's-foot" spikes.

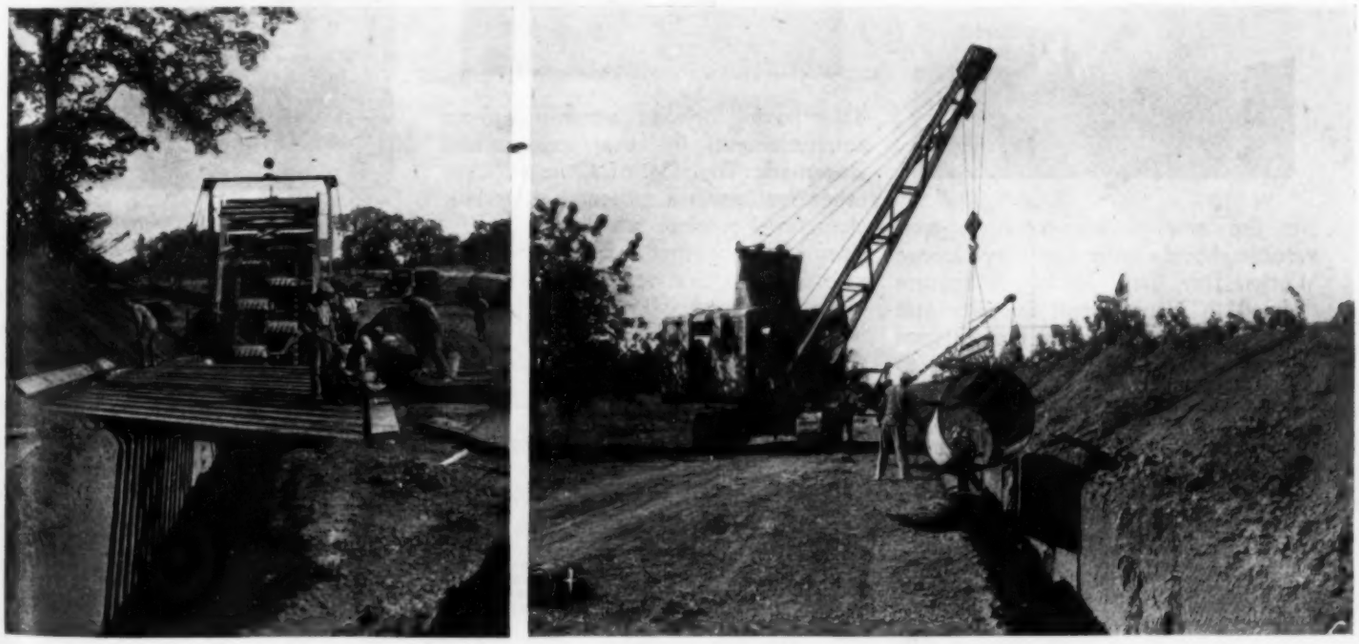
For sprinkling the fill during the process of compacting, the contractor has hung a 2-in. overhead pipe line, with hose connections, on a cableway across the dam site.

The main storage dam for the project forming the Pardee reservoir on the Mokelumne River is under construction by Lynn S. Atkinson of Los Angeles at an estimated cost of $6,000,000.

PARDEE DAM on Mokelumne River at Lancha Plana. The completed $6,000,000 concrete structure, of the gravity type, will be 360 ft. high and will store 204,000 acre-ft. of water. It feeds a 93.8-mile aqueduct, largely of steel pipe.



FILL for the Lafayette dam, excavated by a Marion electric shovel, is loaded into a Mack truck with 8-yd. body.



TRENCHING AND LAYING PIPE for the aqueduct line that will deliver Mokelumne River water to nine cities in the East Bay District.

NEW EQUIPMENT ON THE JOB

Creeper Wheel Wagon Has 10-Yd. Capacity

A bottom-dump wagon on creeper wheels 20-in. wide with an exceptionally large capacity of 15 tons or 10 cu.yd. is now available for hauling

heavy loads over bad roads. The running gear is made by the Creeper Wheel Co. of Reading, Pa., and the wagon portion, 24 ft. 8 in. long and 9 ft. 4¼ in. wide, by the Biehl Iron Works of the same city.

New Convertible Shovel

Four attachments—a ¾-yd. shovel dipper, a ⅝-yd. all-manganese rock dipper, a 35 to 45-ft. crane boom or a trench scoop — are provided

for the new crawler-mounted convertible shovel of the Bay City Dredge Works, Bay City, Mich. A feature claimed to insure great stability and large operating radius is the distance of only 1½-ft. from base of boom to king-pin or center of rotation. The machine can be steered while traveling ahead at full speed. By reason of Zerk-Alemite connections the operator can lubricate all parts from one location. The machine weighs 26 tons and can be shipped without dismantling.

Mechanical Changes in Paving Breaker

New mechanical details affecting type of valve and position of air ports eliminate re-coil or "kick-back" in the

Thor paving breaker, according to an announcement by the Independent Pneumatic Tool Co. of Chicago. Another feature is a patented three-link chain steel retainer which can be dismantled from the breaker; this device prevents the steel from dropping out of the nozzle. The paving breaker is 27 in. long from end of handle to end of retainer and weighs 75 lb.

Shovel Has Improved Continuous Tread Truck

An improved continuous tread truck of the double-chain drive type built up entirely of steel castings is a feature of the "Conqueror," the new convertible

gasoline shovel announced by the Osgood Co., of Marion, Ohio. The power plant is an 80-hp. six-cylinder gasoline engine.

Four-Square Lumber Shipped in Packages

Packaged lumber with ends sawed square at the mill and enclosed in fiber caps, is the new method of merchandising announced by the Weyerhaeuser

Forest Products Co., of St. Paul, Minn. The squared ends on the lumber are produced by a new circular rebutting saw. With this packaged lumber much of the squaring up work of carpenters on the job is eliminated.

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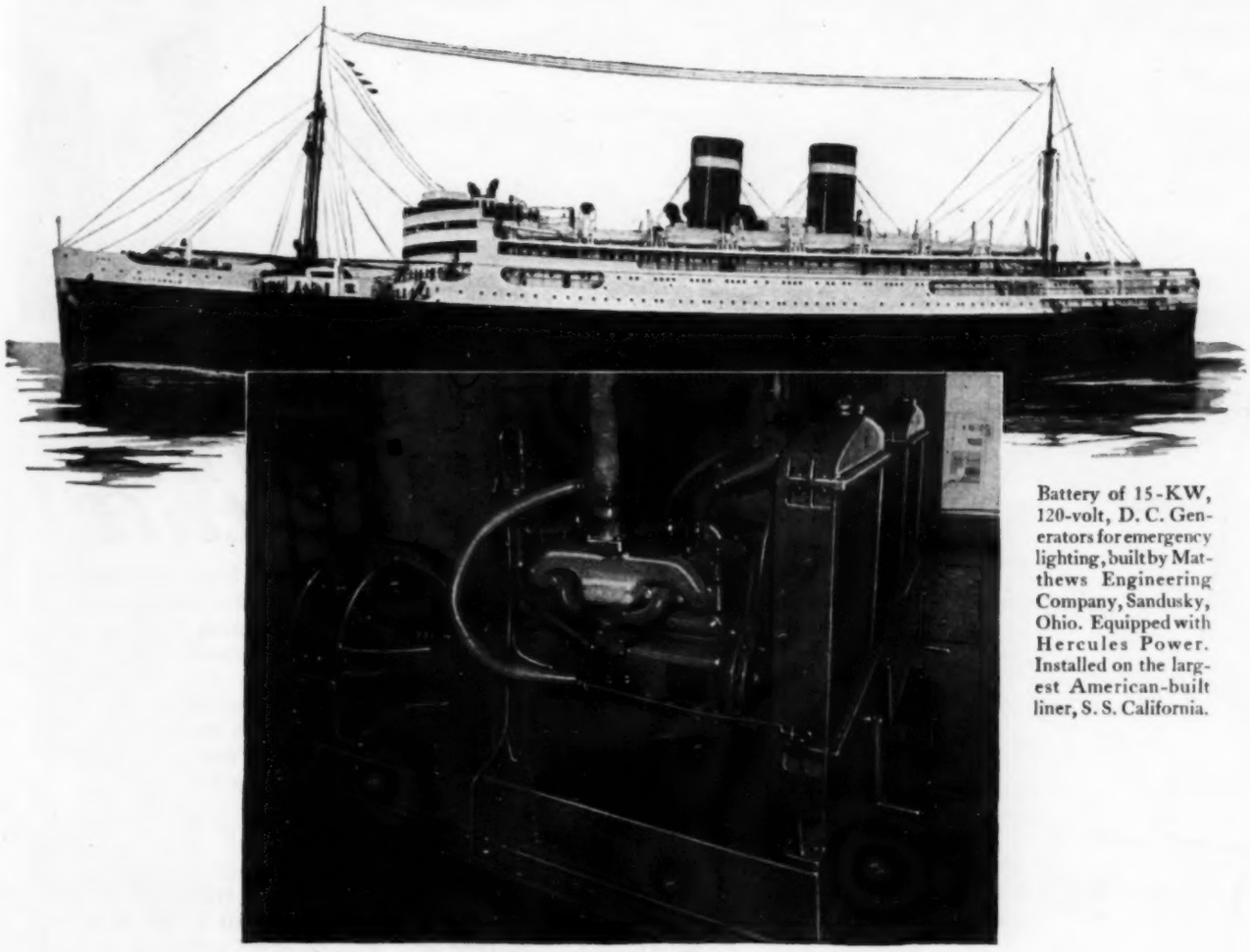


Battery of 15-KW, 120-volt, D. C. Generators for emergency lighting, built by Matthews Engineering Company, Sandusky, Ohio. Equipped with Hercules Power. Installed on the largest American-built liner, S. S. California.

Hercules Goes to Sea

Every industry is familiar with the exceptional performance of Hercules Engines. Road Building, Oil Production, Farming, General Contracting and Commercial Transportation know the reliability and endurance that are typical of Hercules Power.

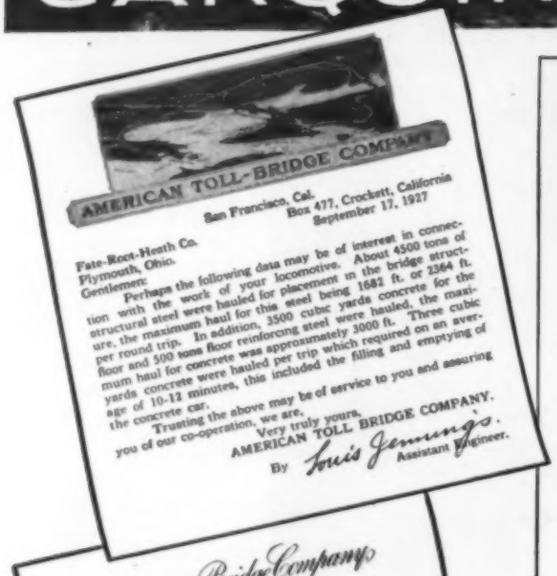
A product of such universal usefulness can be the result solely of seasoned technical knowledge combined with manufacturing skill of the highest order.

Whether the requirement is for an engine of the six-cylinder or four-cylinder type, there is a Hercules model within the range of 20 to 115 horsepower, that will provide the very safest investment in satisfactory power.

HERCULES MOTORS CORPORATION, CANTON, OHIO, U.S.A.

Hercules

ENGINES



AMERICAN TOLL-BRIDGE COMPANY

San Francisco, Cal. Box 477, Crockett, California
September 17, 1927

Fate-Root-Heath Co.
Plymouth, Ohio.

Gentlemen:

Perhaps the following data may be of interest in connection with the work of your locomotive. About 4500 tons of structural steel were hauled for placement in the bridge structure, the maximum haul for this steel being 1682 ft. or 2364 ft. per round trip. In addition, 3500 cubic yards concrete for the floor and 500 tons floor reinforcing steel were hauled, the maximum haul for concrete was approximately 3000 ft. Three cubic yards concrete were hauled per trip which required on an average of 10-12 minutes, this included the filling and emptying of the concrete car.

Trusting the above may be of service to you and assuring you of our co-operation, we are,

Very truly yours,
AMERICAN TOLL BRIDGE COMPANY.
By Louis Jennings, Assistant Engineer.

American Bridge Company
30 South La Salle Street
Chicago Ill.

August 2, 1927

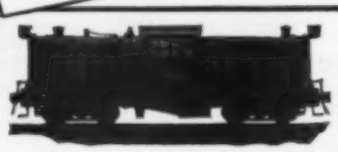
Garfield and Company,
Hearst Building,
San Francisco, Calif.

Attention—Mr. R. L. Pierson.

Gentlemen:

Referring to the Plymouth Locomotive which we used on the construction of the South approach of the Carquinez Bridge, beg to advise that due to clearance between our travelers and the trusses it was necessary to use a narrow gauge locomotive, and after trying out several makes we selected your machine. We handled several thousand tons of steel and equipment up a one per cent grade on a twelve degree curve. This machine handled thirty ton loads without showing any distress and I consider it the best type of gasoline locomotive that I have used.

Yours truly,
W. J. Strickland
Division Erecting Engineer.



50 ton Diesel

Plymouth Gasoline and Diesel Locomotives are built in a full range of sizes from 2 to 50 tons. Designed to reduce fuel and operating costs to a minimum.

Where Another PLYMOUTH Did its Stuff

Forming a link in the transcontinental highway near San Francisco, this great bridge spans the old barrier, Carquinez Strait between Vallejo and Crockett. The main structure, 3350 feet long, consists of two 500 foot anchor spans, a central tower 150 feet and two cantilever fairways each 1100 feet clear span. The total height of towers above high water is 328 feet and the clearance for ships is 135 feet. A steel viaduct approach on the south is itself a huge structure 1132 feet long.

It was necessary to use a narrow gauge locomotive here due to the clearance between the travelers and the trusses. The Plymouth proved out to the best all around advantage and was selected after several makes of locomotives had been tried out.

The letters reproduced here from both American Bridge Company and American Toll-Bridge Company tell the story of Plymouth satisfaction at this important engineering job.

PLYMOUTH LOCOMOTIVE WORKS
The Fate-Root-Heath Company
PLYMOUTH, OHIO

PLYMOUTH

GASOLINE *Locomotives* DIESEL

"HERCULES" RED-STRAND

REG. U.S. PAT. OFF.

WIRE ROPE

A Dependable Wire Rope for Hard Work

"HERCULES" (Red-Strand) Wire Rope is tough, strong and dependable, because it is made of acid open-hearth steel wire, and because every wire put into it is first rigidly tested by us to make sure that it meets our exacting requirements.

If you would reduce your wire rope expense, give "HERCULES" (Red-Strand) Wire Rope a chance to show you what it can do. Try it on your hardest work and keep a record of its relative cost "per unit of work done." Its extensive use is largely due to just such trials.

Made Only By

A. Leschen & Sons Rope Co.

Established 1857

5909 Kennerly Ave., ST. LOUIS

Branches

New York.....Chicago
Denver .....San Francisco

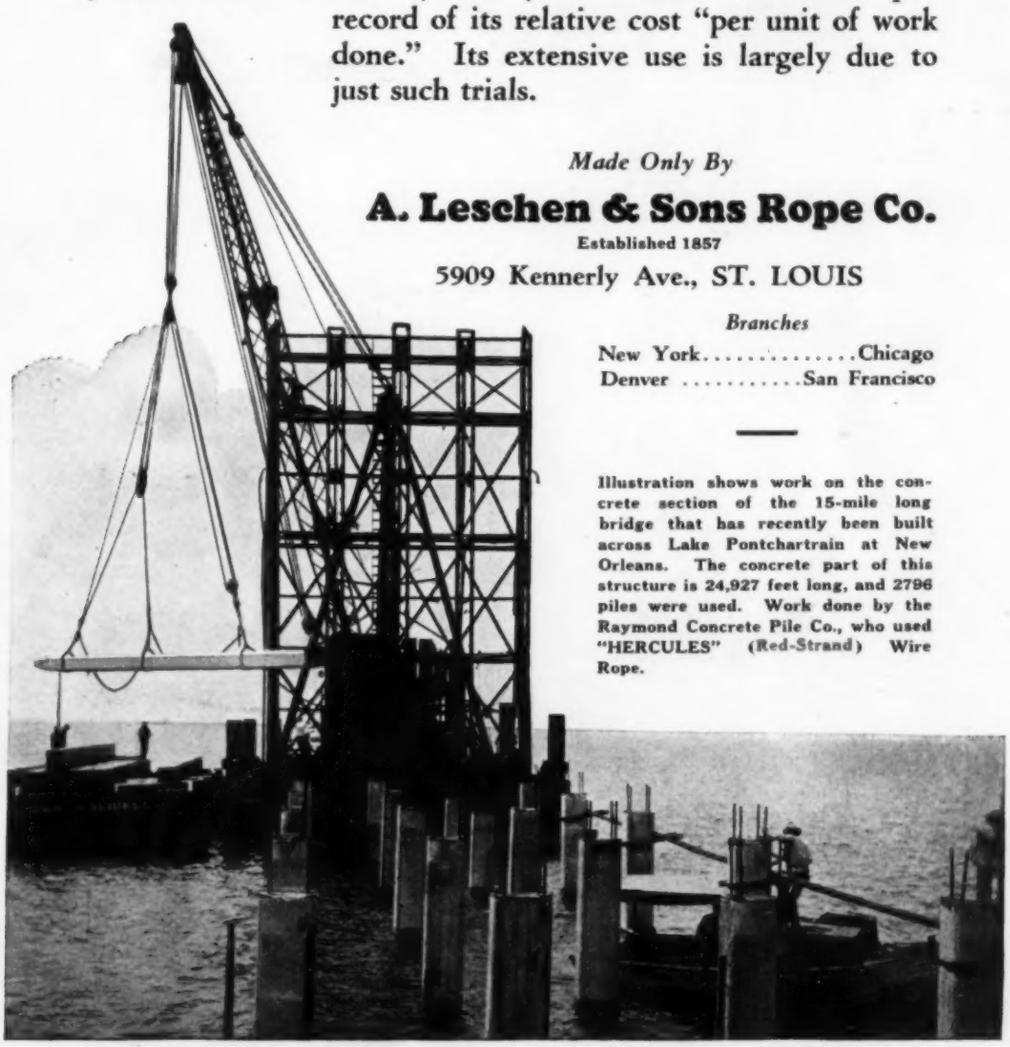


Illustration shows work on the concrete section of the 15-mile long bridge that has recently been built across Lake Pontchartrain at New Orleans. The concrete part of this structure is 24,927 feet long, and 2796 piles were used. Work done by the Raymond Concrete Pile Co., who used "HERCULES" (Red-Strand) Wire Rope.

NORTH

A type for every job!

WEST

3/4 and 1/2 yd.

NOR
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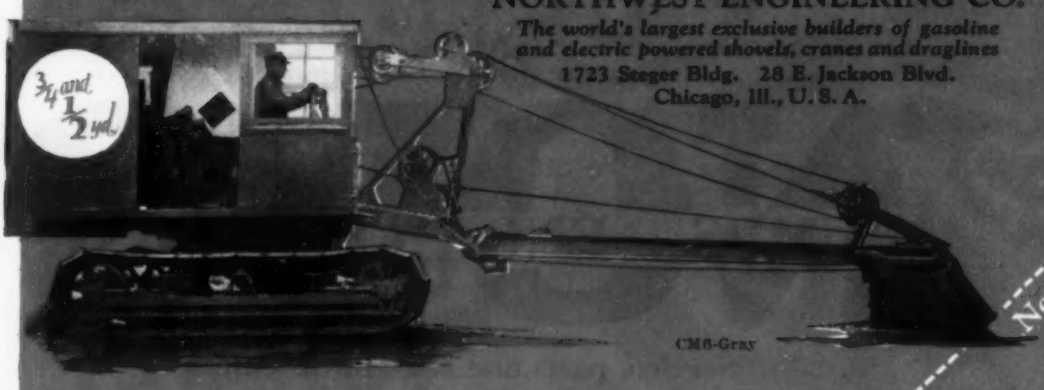


NORTHWEST ENGINEERING CO.

The world's largest exclusive builders of gasoline and electric powered shovels, cranes and draglines

1723 Steger Bldg. 28 E. Jackson Blvd.
Chicago, Ill., U. S. A.

CM6-Gray

Northwest Enginee
1723 Steger B
Chicago, Ill.

ant to know
bout them

NAME

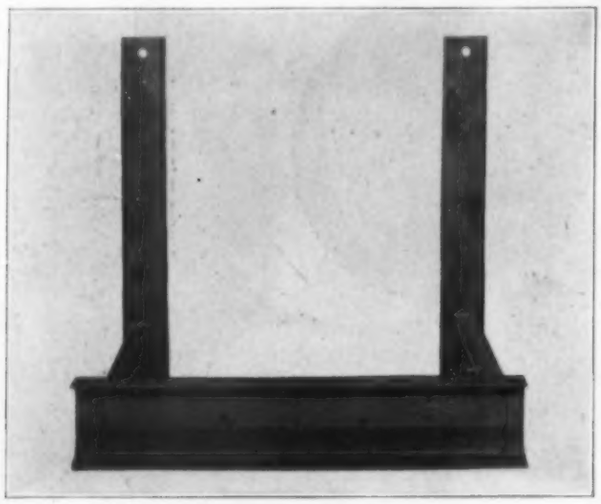
ADDRESS

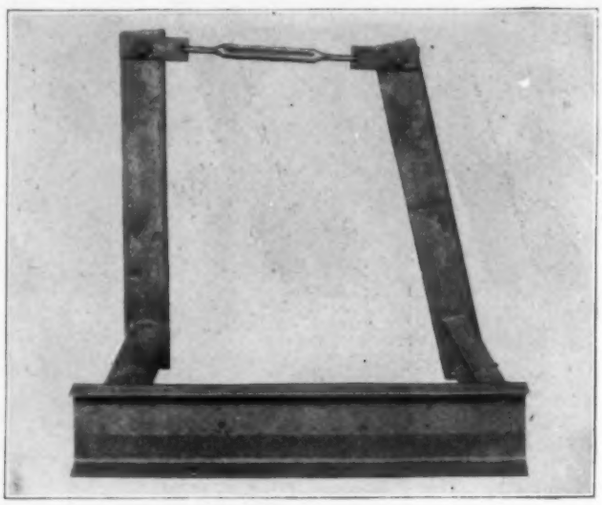
CI

NO OTHER FRAME SO RIGID

CAN'T LOOSEN — NO RIVETS

CAN'T TWIST—TUBULAR CROSS-MEMBERS





Ordinary Construction Gives—Novo Remains Rigid

Novo NH and DH Hoists are the only hoists with welded tubular cross-members— the only hoists with the greater strength and rigidity which such construction provides. What this means on your job is convincingly illustrated in this simple test.

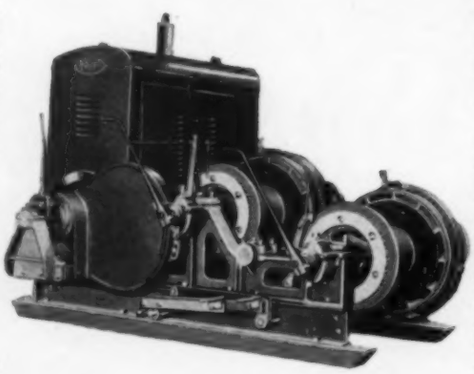
A channel and a tubular member, of approximately the same weight, were welded to a common base. An upright was then welded to the free end of each—so that the two were exactly parallel and perpendicular. A turnbuckle, fastened to the tops of the uprights, was then drawn up.

The illustration above shows the result. The tubular member shows no twist at all. But the channel bent many degrees under the same load.

It is the tubular cross-members that make Novo Hoist frames stiffer and stronger.

And this stiffer construction prevents out-of-alignment—reduces bearing wear—adds many years of service—and increases operating efficiency.

In addition, the Novo frame is welded throughout, which makes it extremely solid—reduces the weight—and eliminates all rivets that are likely to become loose.



This rigid construction — plus many other features, such as double flywheels — keep Novo Hoists operating smoothly many, many years after the ordinary hoists have been discarded.

Novo Hoisting Handbook shows how these can be applied to your own jobs.

NOVO ENGINE COMPANY, 214 Porter Street, Lansing, Michigan
C. E. BEMENT, Vice-Pres. and Gen. Mgr.

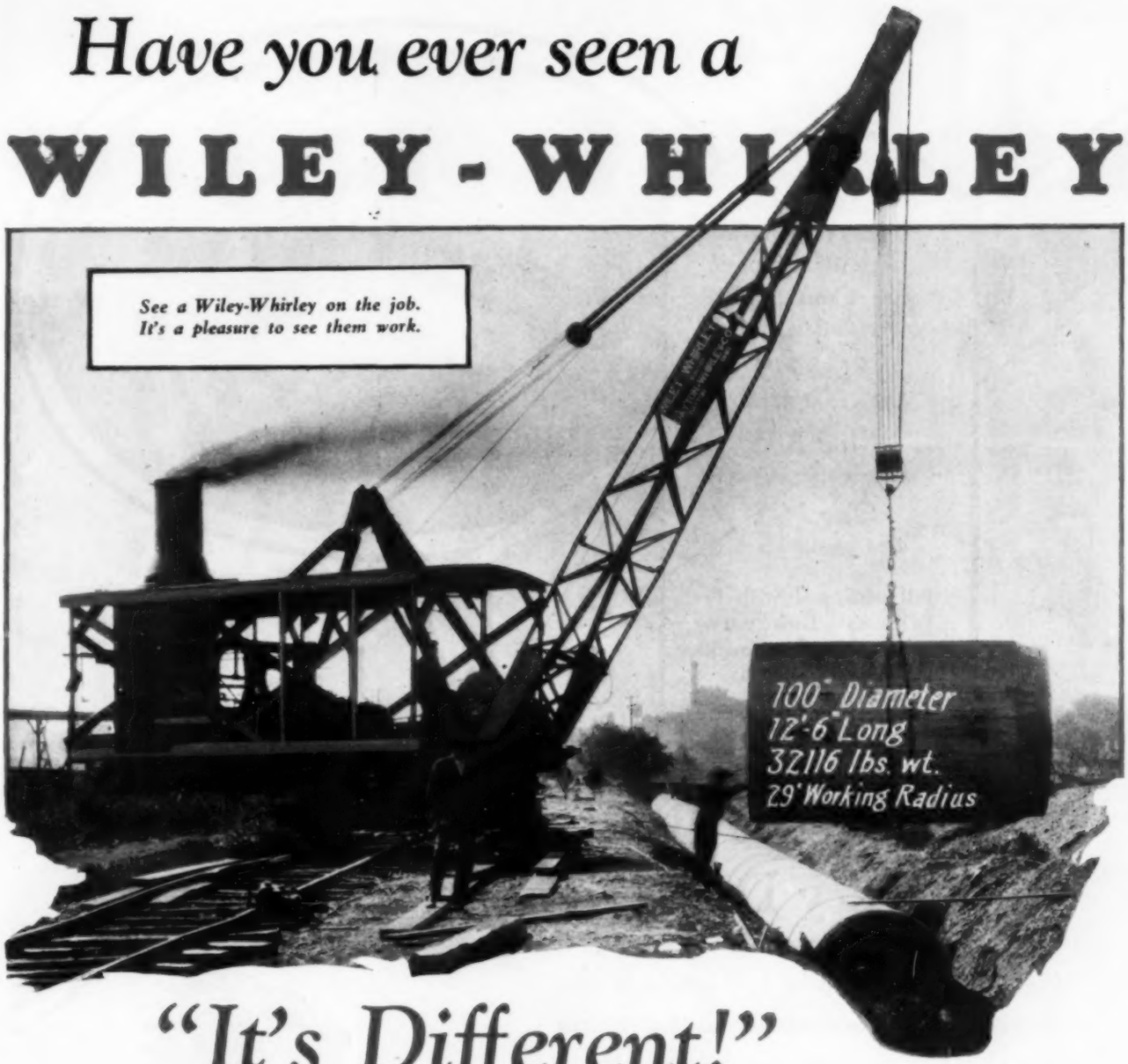
NOVO

PUMPS — ENGINES — HOISTS

Service, parts and sales in 65 cities

Have you ever seen a

WILEY-WHIRLEY



"It's Different!"

DIFFERENT jobs require different kinds of equipment and there is only *one best machine* for every job.

A *Wiley-Whirley* is not an all purpose machine; there is no such thing, but it is a versatile piece of mechanical equipment unlike any other on the market. For the contractor who has clam shell, dragline, crane or derrick work of the type this machine was designed to handle, a Wiley-Whirley will lead to new profits, profits that no other machine can equal, for it is the one best machine on its kind of work. A Wiley-Whirley is a remarkably fast and simple, all steel machine with all parts easily accessible and furnished either with or without power. Booms from 60, 75, 85 or 100!

It was developed in 1919 to do a more profitable job than could be done either with a derrick or a locomotive crane. It possesses the advantages of both without the limitations of either. Every Wiley-Whirley in the field, so far as we know, has a performance record of most profitable, economical and dependable service.

Even though you may not have at the moment any work for the Wiley-Whirley, your knowledge of what it is, what it has done and what it can do may lead you to a better method and larger profits on your next job. Fill out the coupon and our fully illustrated catalog showing Wiley-Whirleys in action will be sent by return mail.

The Dayton-Whirley Co.
DAYTON, OHIO, U. S. A.

The Dayton-Whirley Co.
Dayton, Ohio

Please send your new, unique catalog to

.....

.....

.....

The Austin Company, nationally known Engineers and Contractors own:

Five 7-S
Lakewood Mixers

Five 10-S
Lakewood Mixers

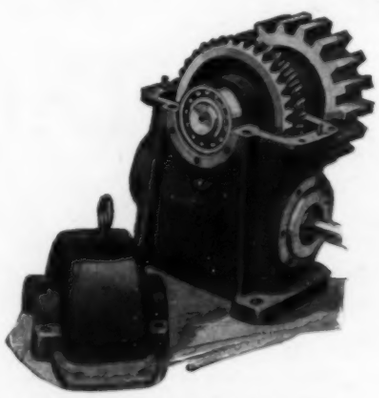
One 14-S
Lakewood Mixer

All equipped with the famous Lakewood Worm Speed Reduction Drive.

More Yards Per Day... Every Day

Eight seconds—and a full batch is discharged. Eight seconds—and the stream line skip has put a full batch in the drum. Real one man operation assured by grouping all operating levers at the drum end of the machine where the operator can SEE what he is doing. Lakewood 10-S Mixers are replacing the older, slower machines.

Write for Bulletin 20-S, it tells the whole story.

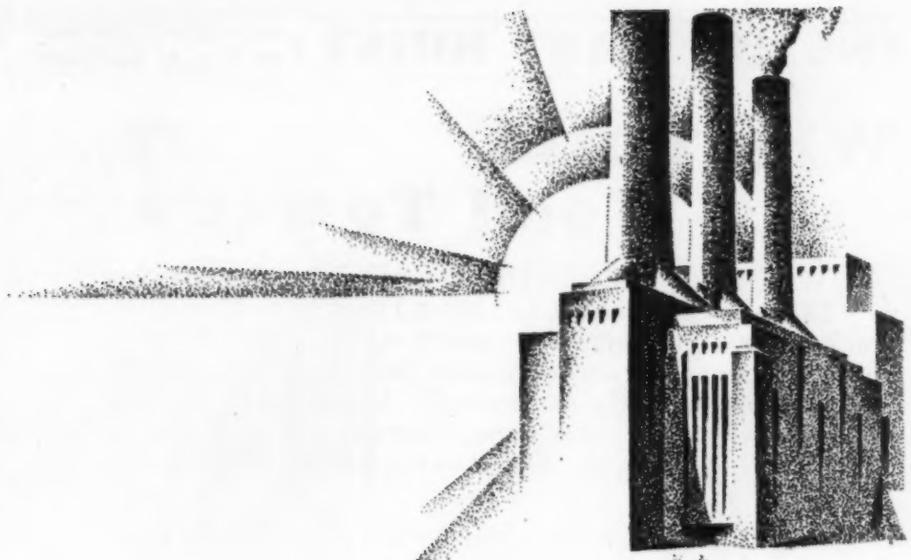


The famous Lakewood Worm Speed Reduction—A bronze worm gear driven by a heat treated steel worm—all enclosed and running in oil. It reduces the crank shaft speed of the power plant to the proper speed for the drum driving pinion.

EXPORT OFFICES: 30 Church St., New York City - - *CABLE ADDRESS:* Brosites

LAKEWOOD

The Lakewood Engineering Co., CLEVELAND - O.



SERVICE

Mills and offices stretching across the country—service to you wherever your job may be! "Lehigh" means dependability.

LEHIGH CEMENT

LEHIGH PORTLAND CEMENT COMPANY

Allentown, Pa. Buffalo, N. Y. New Castle, Pa. New York, N. Y. Boston, Mass. Pittsburgh, Pa. Chicago, Ill. Philadelphia, Pa. Cleveland, O. Minneapolis, Minn. Birmingham, Ala. Baltimore, Md. Mason City, Ia. Omaha, Neb. Spokane, Wash. Richmond, Va. Kansas City, Mo.

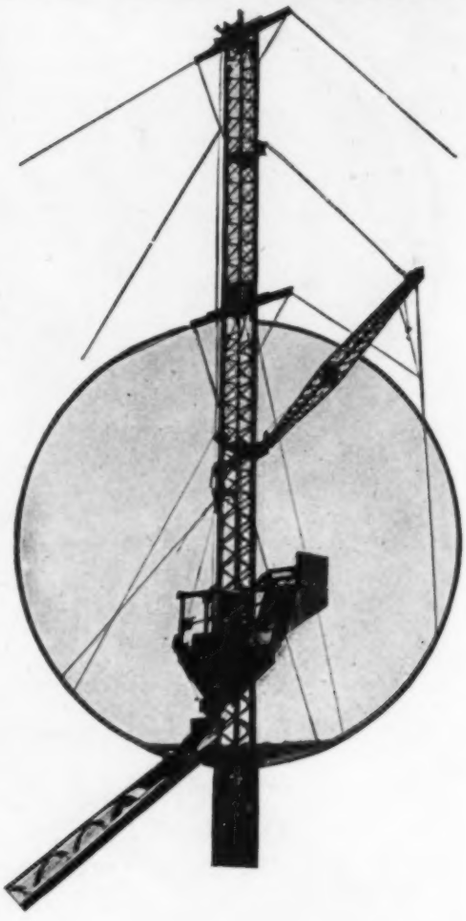
INSLEY MAST HOIST • CONCRETE PLACING MATERIAL HANDLING • **EQUIPMENT**

Why Build A Wood Tower?

A WOOD tower with a bucket and hopper costs only a little less than an Insley Mast Hoist to do the same work. A two compartment wood tower to hoist material and concrete simultaneously costs half again as much as a Mast Hoist to do the same work. Any wood tower is a total loss when the job is done, whereas a Mast Hoist is good for innumerable installations, since it is made entirely of steel.

Many owners say that their Insley Mast Hoists save the cost of a wood tower every time they set them up. Many Mast Hoists have been set up five and six times, and some of them on as many as eighteen or twenty jobs.

Figure out what the possible saving of a Mast Hoist is on your work, and you will realize that you need one in your business.



(1) Hoists Steel and Form Panels with the Chicago boom.

(2) Hoists and places concrete with the bucket and chutes.

(3) Hoists brick, tile and other miscellaneous bulk material with the elevator.

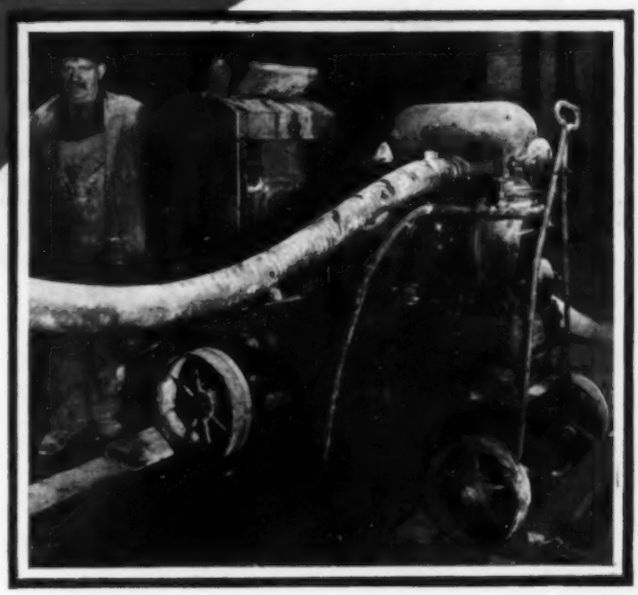
THE INSLEY MAST HOIST

Three Plants In One

607

INSLEY MANUFACTURING COMPANY - Indianapolis

Engineers and Manufacturers



HUMPHRYES 960EDT-3
at work on a big job

Illustration shows pump in action in the sub-basement of the New Uppercu-Cadillac Building, New York City. The closed discharge makes this pump adaptable to either indoor or outdoor work.

UPPERCU-CADILLAC BUILDING, NEW YORK CITY.

HUMPHRYES Pumps deliver *"more gallons per day"*

ON big building jobs where excavations are larger and deeper, and there is more water to handle, the pump you need is the one that can be depended upon for *more gallons per day.*

It is Humphryes reputation for *more gallons per day* and less time lost in repairs and replacements, that makes it the choice of contractors for the bigger, more important jobs.

Write today for complete information and descriptions of all Humphryes Pumps

THE HUMPHRYES MANUFACTURING COMPANY
ESTABLISHED 1882
MANSFIELD, OHIO

HUMPHRYES
CONTRACTORS' PUMPS

ACCEPT NO SUBSTITUTE

Sterling

"10-spoke" wheel with a smooth tread gives greater strength, rigidity and service

No part of a barrow receives as hard abuse as does the wheel—bumped over rocks, jammed against walls, charging hoppers—sharp twists and turns with a full load. To withstand this severe usage Sterling found that the ordinary barrow wheel was not strong enough. In the Sterling wheel you will find a specially engineered idea. The wheel has "10 spokes" instead of the usual 8. The spokes are riveted and shouldered to the tire and cast to a wrought steel hub. The wheel is equipped with self-lubricating bearings, no oil service ever needed. The wheel and bearings revolve on a round, cold rolled steel shaft, not an ordinary bolt, which is keyed in a stationary position, by means of split pins, to malleable iron brackets—can't bind.

SPECIAL STERLING FEATURES

Self-lubricating bearings	Selected maple handles
10-spoke wheel	Special tubular steel handles
Malleable iron brackets	Handles clamped—not bolted
Smooth wheel face	Top of tray reinforced
Wrought steel hub	Channel steel legs
Riveted and cast to hub spokes	Riveted leg braces
Fixed rolled steel axle	Extra leg shoes
"V" front tray braces	Wrought iron handle tips

All parts interchangeable

Compare this construction and you will quickly see why more contractors use Sterlings than any others. *Try them on your next job.*

Buy by Sterling name—leading hardware and equipment dealers have them or they can get them quickly from our complete stock warehouses at Chicago, New York, Philadelphia, Pittsburgh, Cleveland, Detroit, St. Louis

STERLING WHEELBARROW COMPANY

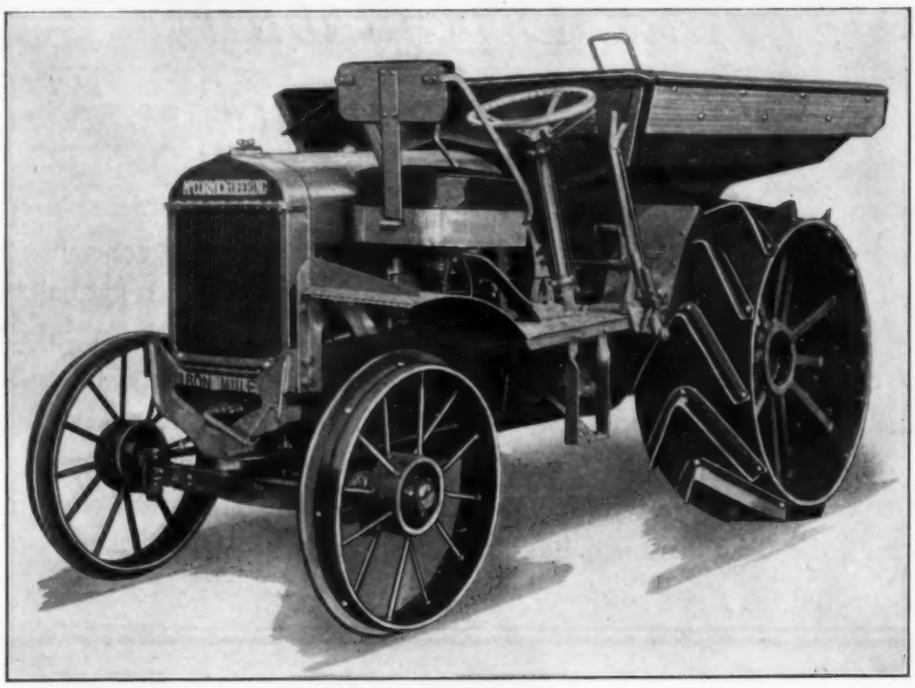
STERLING ON A WHEELBARROW MEANS MORE THAN STERLING ON SILVER

Milwaukee Wisconsin

IRON MULE

TRADE MARK REG. U.S. PAT. OFF.

The Original 2 Yard Tractor Dump



Power! That Pulls!

Made the Iron Mule Famous

IT'S when trucks start digging themselves in and animals mark-time with every ounce of energy thrown into tauten traces that you realize *what* a "pull" you've got with an Iron Mule. By changing direction of drive the front wheels have become the drive wheels, giving a power that pulls instead of pushes. That's why grades and going difficult for trucks come easy to this marvelous unit.

With an Iron Mule on the job you've got a pull in more ways than one. A pull on operating costs because Hughes-Keenan 10-20 Iron Mule hauls more and larger loads than trucks or teams, at a lower operating cost—a pull on time and the other fellow because these short haul marvels can run anywhere—on dirt roads, stone roads or through muck and mush of any construction job. They are easy to handle—turn on a dime and the driver doesn't have to jockey for position—he's always facing the load.

Run one of these hustling units out on your job—watch it in a work-out and you'll decide there and then it beats trucks and animals at every turn.

Ask your dealer for a demonstration or write direct for full information.

HUGHES-KEENAN CO., Mansfield, Ohio

HUGHES-KEENAN

Steel Dump Bodies

Demonstrating
Atlas Dependability and Permanence

For every engineer and contractor, there is more than passing interest in the Atlas national advertising campaign this year. ¶It presents no claims or generalities; relates no fables; nor does it attempt to look into the future through a crystal ball. ¶With fact after fact, actual example after actual example, it demonstrates that great organizations, choosing Atlas once for an important project, rely on it again and again. ¶One shows that the New York Central, choosing Atlas fifteen years ago for their Grand Central Terminal, specified it again in 1924 for the mighty Castleton Cut-Off Bridge over the Hudson. ¶Another, that the Thompson-Starrett Co., who built the Bush Terminal Building, New York, of Atlas in 1916, selected

ATLAS PORTLAND CEMENT GRAY & WHITE

Main Offices: New York — St. Louis

NEW YORK · ST. LOUIS · CHICAGO · BIRMINGHAM · KANSAS CITY · PHILADELPHIA · BOSTON · DES MOINES · OKLAHOMA CITY · OMAHA · ALBANY

Atlas ten years later for the Miami-Biltmore Hotel and Country Club. ¶Still another, that for both the American Telephone and Telegraph Building and the New York Telephone Building, constructed twelve years apart, Atlas was used. ¶More are to come. ¶Thus is cumulative evidence of Atlas *dependability* and *permanence* presented to the vast circulations of leading national magazines. Thus are engineers and contractors given irrefutable testimony that they can rely upon in making their own decisions concerning portland cement. Thus are their clients won to even a greater approval whenever Atlas is specified and used. THE ATLAS PORTLAND CEMENT COMPANY, *25 Broadway, New York.*

"I DIDN'T KNOW THERE WAS A 3½S NON-TILTER!

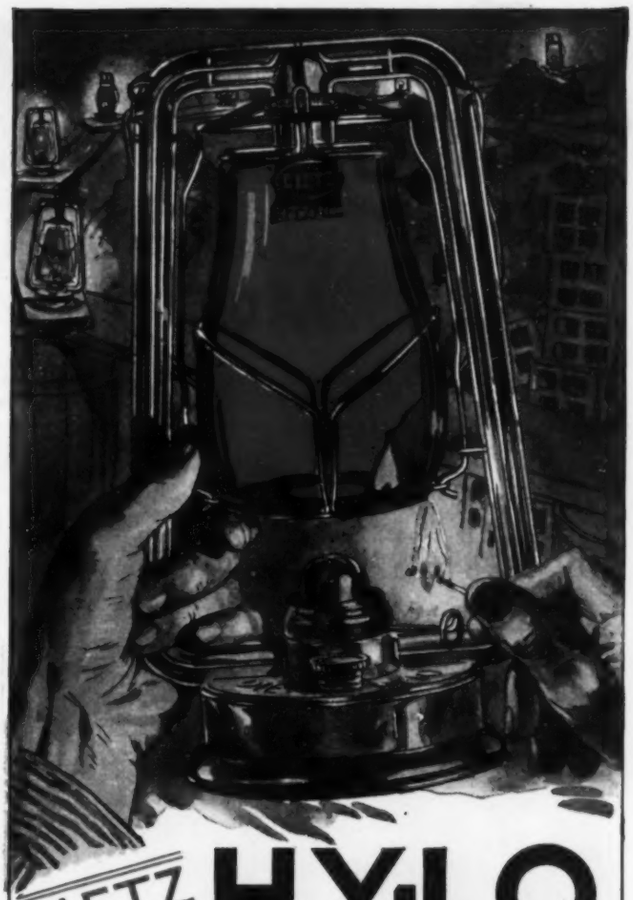
"YES, SIR, BEATS A TILTER ALL HOLLOW! CHARGES FASTER ANY WAY YOU USE IT! NO DRUM TO ROLL BACK—AND IT MIXES BETTER STUFF!

IT'S BUILT JUST LIKE THE BIG MARSH-CAPRON MIXERS THAT AVERY BRUNDAGE, JOHN W. GRIFFITH AND SO MANY OTHER BIG CONTRACTORS ARE USING.

WHY DON'T YOU GET THAT BOOKLET THAT MARSH-CAPRON HAS ON THE SUBJECT?"

The Marsh-Capron Co.
11 S. LaSalle St. • Chicago
3½S•5S•7S•10S
14S•21S and 28S
Tilters and non-tilters

CM6-Gray



DIETZ **HY-LO** HOT BLAST *for* Contractors

DO YOU expect your lanterns to stay lighted on the job ALL night?

Then it's not safe to say—"Send me a dozen lanterns!" Better to say—"Send me a dozen DIETZ Lanterns!"

For Dietz Lanterns have a "Balanced Draft" and "All Weather" burning dependability.

A distinguishing feature of Dietz HY-LO Hot Blast Lantern is the Direct Globe Lift — preferred by many Contractors.

For a small additional sum, we stamp the initials of Contracting Firms into the metal of Dietz Lanterns, making them easy to identify.

R. E. DIETZ COMPANY

NEW YORK

LARGEST MAKERS OF LANTERNS IN THE WORLD

Founded 1840

DIETZ LANTERNS

The Cascade Tunnel

GREAT NORTHERN RAILWAY CO.

by A. GUTHRIE & Co., Inc.
CONTRACTORS

The Longest Tunnel in America
The Fourth Longest in the World

7.79 miles of concrete lining are being poured in Blaw-Knox STEEL FORMS.

Six units of forms (three working at each end) enable A. Guthrie & Co., Inc., to maintain a steady and fast schedule of concreting.

The Blaw-Knox Travelers which handle the Steel Form units also carry the mixing plant and the gun for shooting the concrete into place.

Engineering co-operation between Blaw-Knox and A. Guthrie & Co., Inc., resulted in the design of Steel Forms and plant equipment of unusual efficiency.

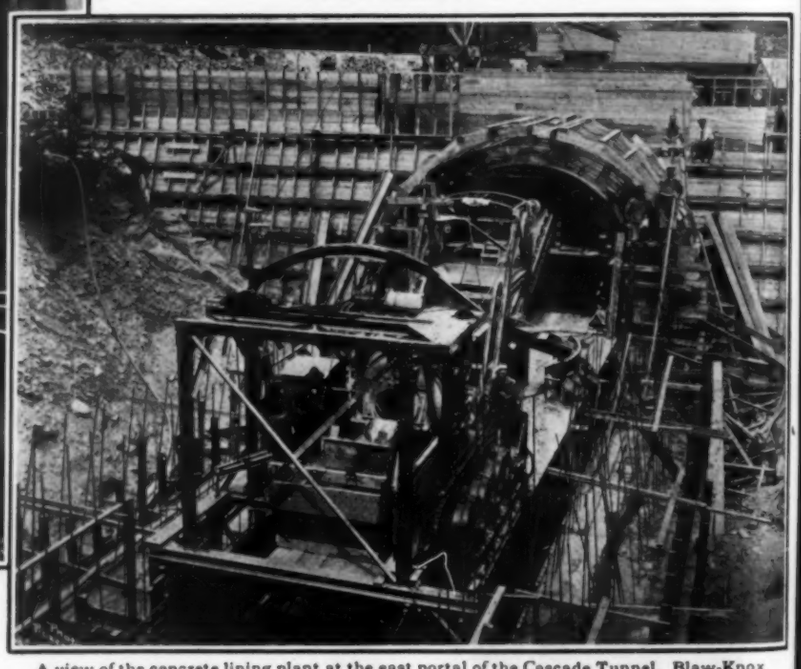
Blaw-Knox has the ability to swap experience with construction men and to build Steel Forms which will carry the job to a successful conclusion.

Engineering advice is furnished *gratis* on concrete jobs of every description.

BLAW-KNOX COMPANY
686 FARMERS BANK BLDG., PITTSBURGH, PA.

Offices and Representatives in Principal Cities
Export Division—Milliken Bros. Blaw Knox Corp.
342 Madison Ave., New York City

One of the six units of 16'x 22' Traveling Collapsible STEEL FORMS furnished by Blaw-Knox Company. Note that there is ample clearance for the passage of batch cars and muck trains.



A view of the concrete lining plant at the east portal of the Cascade Tunnel. Blaw-Knox Steel Forms are shown in place. The traveler which shifts the forms was designed by Blaw-Knox to also carry the mixer and the concrete gun.

TRADE MARK BLAW-KNOX

BLAW-

concrete lining speeded up with LABOR SAVING STEEL FORMS

CHARLES FFOLLIOTT
Chairman

H. L. MUNDY, President
J. C. BAFTER, Vice President

A. D. McDOUGALL, Vice President
MATT McDOUGALL, Vice President & Secretary

RAILROAD CONSTRUCTION
STRIPPING & MINING IRON ORES
FOUNDATION WORK
CONCRETE WORK
TIMBER WORK
TUNNELS
BRIDGES
DAMS

A. Guthrie & Co., Inc.

CONTRACTORS – ENGINEERS

ST. PAUL OFFICE
DUNLEERS EXCHANGE BLDG.

PORTLAND OFFICE
888 SHERLOCK BLDG.

St. Paul, Minnesota,
March 5, 1928.

Blaw-Knox Co.,
Pittsburgh,
Pennsylvania.

Gentlemen:

The six units of forms carrying mixer platforms and distributing systems for the new Cascade Tunnel have now been in use for several months, and I wish to compliment you on the excellent manner in which you developed our ideas in the construction of these units. When we submitted our sketches to you we realized the problem was a difficult one on account of the very small clearances that were available and the necessity of operating muck and concrete trains thru the form units without interruption. We have nothing but praise for the way in which your Company solved this problem.

The forms have been in use now for several months and we have exceeded our highest expectations in the matter of speed of placing the lining. It seems now that we will fully complete the Cascade Tunnel in less than three years from the date of first breaking ground, and if this is accomplished the successful operation of the Blaw form units will be one of the important factors aiding us to attain that result.

You may rest assured that we will submit to you for study our next tough problem in form design.

Yours truly,

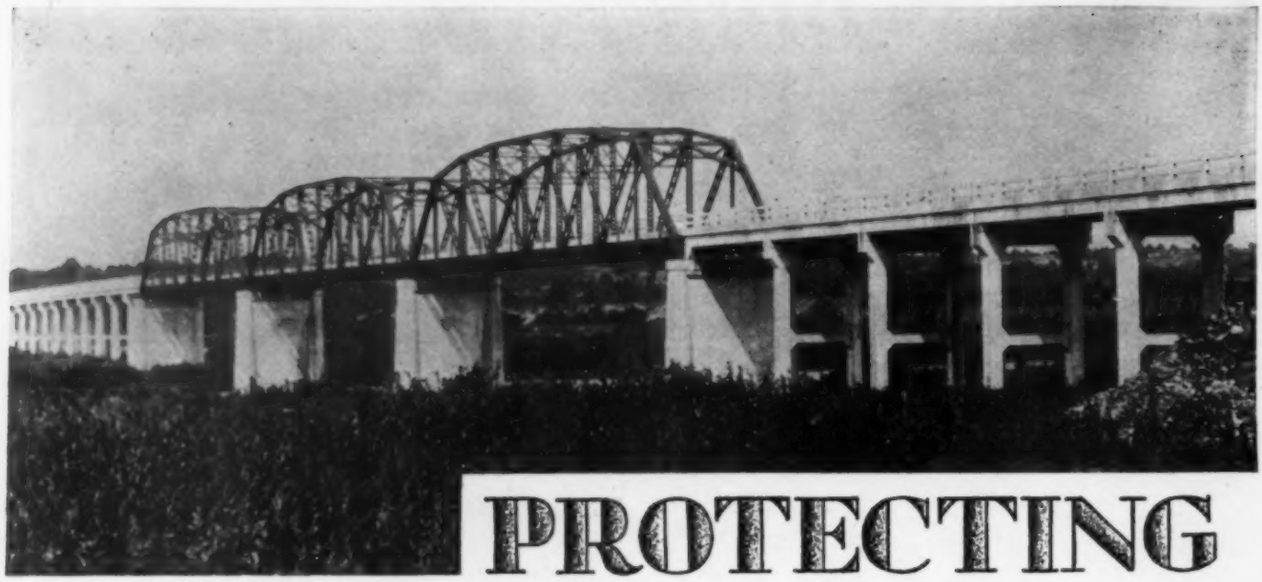
J. C. Bafter.

Vice President

JCB-w

BLAW-KNOX

The Catawba River Bridge in South Carolina is being lastingly protected with Carey Elastite Expansion Joint.



PROTECTING the bridge and the engineer's reputation

THE Catawba River Bridge as well as the construction engineer's reputation are being safeguarded by Carey Elastite Expansion Joint. And because it prolongs the life of concrete bridge structures, the use of this material is always endorsed by taxpayers, too.

As you know, Carey Elastite Expansion Joint consists of a heavy body of fibrous asphaltic compound, sandwiched between two substantial layers of asphalt-saturated felt.

It absorbs expansion and contraction, prevents over-stresses in the structure, protects concrete against breakage and extends its length of service. It will not melt in summer, neither does it become brittle in winter.

Carey Elastite Expansion Joint is made in preformed strips, in widths, lengths and thicknesses as desired, and is as easy to handle as a board.

We'd like to tell you the complete story. Write for particulars about modern methods of Expansion Joint installation.

Carey Elastite EXPANSION JOINT

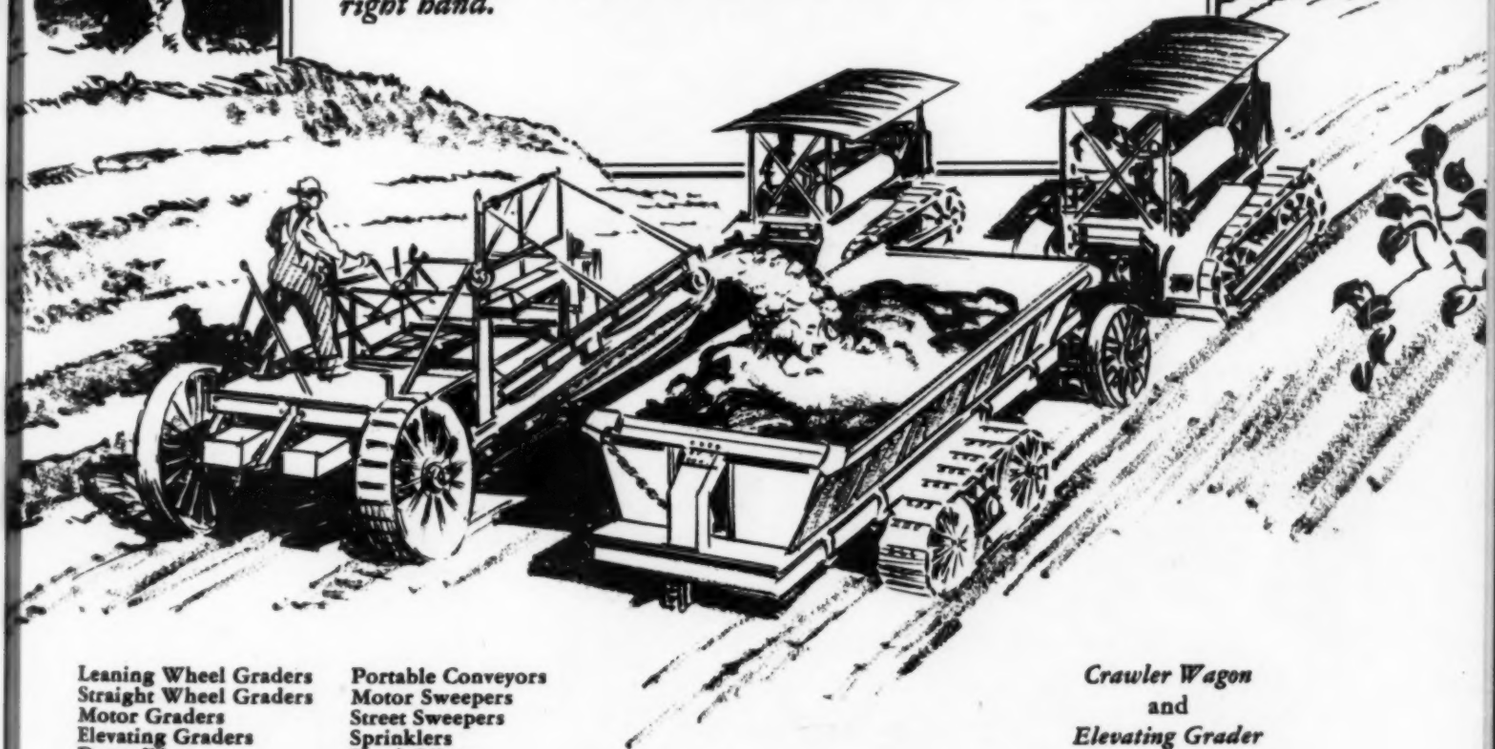
THE PHILIP CAREY COMPANY, *Lockland,* Cincinnati, Ohio

THE AUSTIN-WESTERN LINE

EARTH HANDLING

Keeping Step with Progress

Even to the cheapest known method of moving dirt, Austin-Western experience and resources have brought added economies. Since Civil war times, Austin-Western has developed elevating graders to meet practical working conditions. Now Austin-Western has replaced the horse-drawn wagon with a tractor-drawn crawler dump wagon of 7-yard capacity, revolutionizing this time-tested combination. This crawler dump wagon carries five times more dirt—and works with an elevating grader on the roughest going *like your left hand works with your right hand.*



Crawler Wagon
and
Elevating Grader

Leaning Wheel Graders
Straight Wheel Graders
Motor Graders
Elevating Graders
Dump Wagons
Crawler Dump Wagons
Scarifiers
Rock Crushers
Portable Conveyors
Motor Sweepers
Street Sweepers
Sprinklers
Road Oilers
Culverts
Hot Patch Repair Outfits
Plows and Scrapers

AUSTIN-WESTERN
ROAD MACHINERY

"MOST MILES FOR YOUR ROAD DOLLARS"

You get more mileage from this dollar saving combination

The Western Crawler Dump Wagon
has revolutionized the earth handling industry

Its sensational performance on whatever job it has been installed always calls forth enthusiastic praise and invariably brings repeat orders. It is designed to use to advantage the full power from, and to operate economically behind a crawler tractor.

Ninety per cent of its load is carried on broad Athey Truss Wheels. It can be pulled, heavily loaded, over soft ground, rough ground, or sand. Wherever a tractor can lead, this wagon can follow.

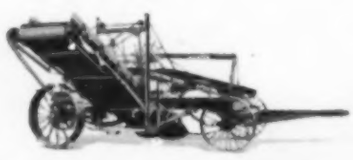
Its enormous capacity saves the wages of four men, the upkeep of teams and the daily loss of time usually spent in maintaining smaller wagons. Government engineers rate the capacity of this all-steel wagon as equal to five 1½ yard dump wagons. Its capacity, and a speed of operation about twice that of a team of horses, makes it a great dollar saver on long hauls.

Elevating Graders

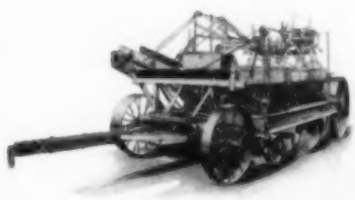
The Austin-Western Line of elevating graders, any one of which when operating with the Crawler Dump Wagon makes the cheapest known method of moving dirt, are shown below. The Austin "New Era" operates behind the lighter tractors, while the Austin "Contractors Special" and the Western Elevating Grader are built for service behind the most powerful tractors.

The Austin "New Era"

The Austin "Contractor's Special"



The Western Elevating Grader



The Austin-Western Road Machinery Co.
Dept. 1406 400 N. Michigan Ave., Chicago, U. S. A.

☐ Motor Graders ☐ Road Graders ☐ Snow Plows
☐ Rollers ☐ Scarifiers ☐ Rock Crushers ☐ Oilers
☐ Portable Conveyors ☐ Elevating Graders
☐ Dump Wagons ☐ Street Sweepers ☐ Sprinklers
☐ Hot-Patch Repair Outfits ☐ Plows and Scrapers

Please send literature and full information on items checked.

Name.....

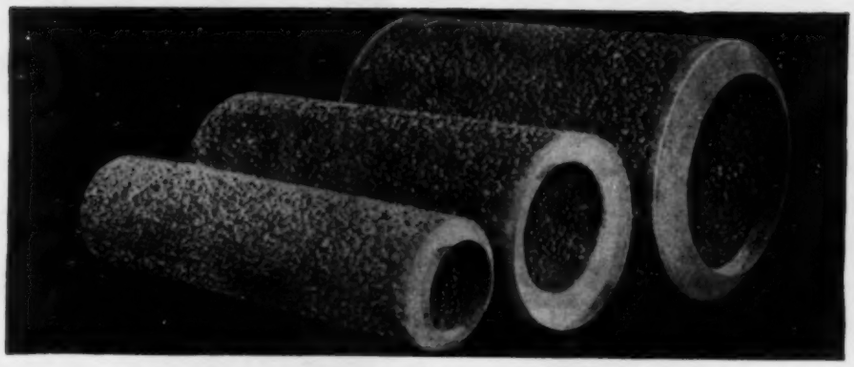
Address.....

.....

The Austin-Western Road Machinery Co.

400 North Michigan Avenue
CHICAGO, ILLINOIS, U. S. A.

Branches in principal cities



Good-Bye, Ol' "Necktie!!"

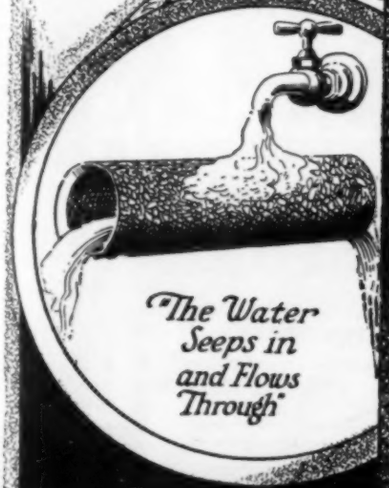
IN the past, every type of drain pipe had to have a "necktie" when it was put into the ground. That was because every pipe had solid walls.

The "necktie" was usually a strip of burlap laid over the open space between the lengths of each solid-wall drain pipe. It was placed there to keep out stone, dirt and other foreign matter. The lengths of pipe could not be brought close together. If they had been, no water would have drained into them at all. But, of course, the "necktie" quickly rotted away, thus allowing foreign matter to find its way into the pipe and clog it.

"Poroswall" knows no "neckties."

It never needs them. In fact, its lengths are brought close together, spigot-end into bell-end. This insures exact alignment and continuous flow-lines. Both advantages are possible only in "Poroswall," which, as its name implies, is porous throughout its walls, having—

"A Foot of Drainage for Every Foot of Wall."



WALKER POROSWALL RAPID DRAIN PIPE

Walker Cement Products, Inc.
Little Ferry N.J.
Plants at Little Ferry, N.J. & Baldwin L.I. N.Y.

Send Coupon below for sample Pipe Section & Booklet

Please Print!

[Name] .....

[Address] .....

.....

C.M.

CLYDE

HOISTS CLYDE DERRICKS

Every proven device tending to safety and economy of operation is incorporated in Clyde-made Hoists.

Picture—Funari & Behling, contractors, erecting steel for new Second Bank of Detroit building with Clyde 60 H. P. Gasoline Hoist.

You'll Take Pride In Your Clyde!

CLYDE IRON WORKS SALES CO.

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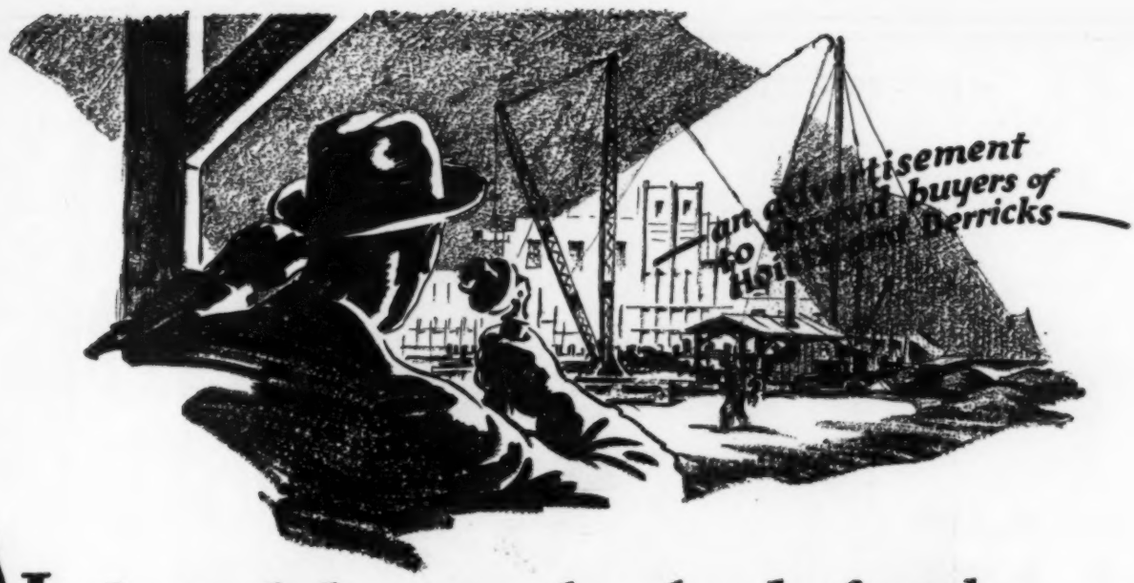
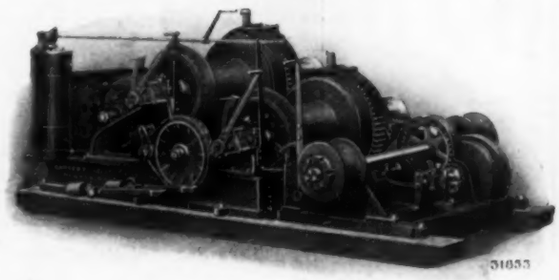
CLYDE TWO MARKS OF GUARANTEED QUALITY

SUCCESSFUL PERFORMANCE FOR AGC-A



"I phoned them in the dead of night and got service!"

We're proud of such incidents out here at the Lambert plant. For they do frequently happen. Some Lambert user wants *rush work* on a hoist—sometimes repair work on another make hoist—and he knows that Lambert Service can be depended on. *You* can depend on Lambert. When you buy a Lambert hoist, crane or derrick, you can depend on its costing you *less* in the long run. The way it's made, the way it will stand up on the job and its greater resale value—all these things influence experienced shrewd men to select Lambert equipment. And have you ever stopped to consider that our location at Newark means cheaper, quicker shipments to far west than shipments from middle western points?



LAMBERT

THE **HOISTS** EXPERIENCED CONTRACTORS BUY

You will send this coupon if

you want to know why a Lambert Hoist, Crane or Derrick is the cheapest you can buy....

considering economical operation, long life, few repairs, and resale value.

We do not aim to compete with any hoist on a strictly first-cost basis. But we can put in your hands information that will show you many hard dollars saved over any so called purchase price "economies." Just make us prove it....

LAMBERT HOISTING ENGINE CO.
117 Poinier St., Newark, N. J.

I am interested in dependable and economical hoists ☐ derricks ☐ cranes ☐ (Check one wanted). Kindly send me information on the latest designs and show me how they will save me money.

Name .....

Address .....

New York State National Bank *Albany, New York*
Henry Ives Cobb, Architect
The Foundation Company, General Contractor

The New York State National Bank, in Albany, has recently been completed by The Foundation Company. In its design the architect used for the main entrance the façade of the original bank built in 1803. The east wing occupies the site of the old bank and was constructed after the façade was placed in its new position and the remainder of the old building rased.

THE FOUNDATION COMPANY

CITY OF NEW YORK

Office Buildings
Industrial Plants
Warehouses
Railroads and Terminals
Foundations and Underpinning
Filtration and Sewage Plants

ATLANTA
PITTSBURGH
CHICAGO
SAN FRANCISCO

MONTREAL
MEXICO CITY
CARTAGENA, COLOMBIA
LIMA, PERU

LONDON, ENGLAND
PARIS, FRANCE
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Hydro-Electric Developments
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BUILDERS OF SUPERSTRUCTURES AS WELL AS SUBSTRUCTURES

EIGHT *for* C.H.Earle Rockville Cent Long Isl N.Y.

SIXTEEN *for* SOUTHERN CONSTRUCTION PAVING CO. Gulfport, Miss.

The Foote Company, Inc.
of Nunda, N. Y.
World's largest exclusive builders of road pavers

Frank E. Hall
152 W. 42nd St., New York City
Wilcox Brothers, Inc.
588 Chenango St., Binghamton, N. Y.
E. J. McHarg & Co.
31 Crestmont Rd., Binghamton, N. Y.
MultiFoote Sales Company
2811 West Fulton St., Chicago, Ill.
Burton Franklin
Volunteer Bldg., Chattanooga, Tenn.
Edward R. Bacon Company
Folsom at 17th St., San Francisco, Calif.

MULTIFOOTE
The Paver with Timken Bearings

Repeat orders are the best proof of steady footage

CM6-Gray

Breaking ground for a new drydock with a Cleveland C6 Paving Breaker. Dock will be 715 ft. long, 93 ft. wide at bottom, 113 ft. wide at top.

It will take 18 months to complete the work.

Starting a $2,000,000 Job with a Cleveland C6 Paving Breaker

Before big men start big jobs they plan to cut cost corners in every way possible. President William H. Todd, of the Todd Shipyards Corporation, acts after the most approved fashion.

He broke ground for the new $2,000,000 dry dock of the Robins Dry Dock & Repair Company with a Cleveland C6 Paving Breaker.

Cleveland C6's will serve him long, faithfully and economically.

Let us demonstrate to you on your work how the C6 will speed up the job and reduce costs. Write.

The Cleveland Rock Drill Company

3734 E. 78th St. Cleveland, Ohio

Branches, Agents and Service Stations in Principal Cities of the World

CLEVELAND ROCK DRILLS

Jaeger's "Jiffy" Placing Plant

Conveys and Places Concrete ~ at a 50% Saving in Wages of Wheelers

An Inexpensive Plant that can be Set Up or Knocked Down in a Jiffy—Adjustable up to 100 Feet in Length—also Flexible in Height

ON its proper job, which is distributing mass concrete over large areas, bridges, viaducts or up to 3-story buildings, this Placing Plant will double your mixer output by allowing batches to be dumped in skip car as soon as mixed *without waiting for wheelers,* and conveyed direct to hopper for short spouting or wheeling to forms.

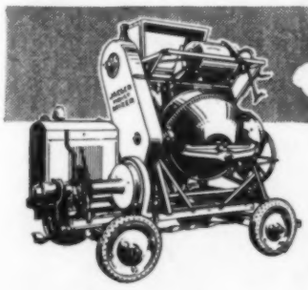
As a conveyor, using up to 13 sections, you can move material over 100 feet exclusive of spouting. Costs ⅓ the price of an ordinary belt conveyor. Also has big advantage over ordinary towers because mixer and materials can be put in street or on hard ground and mixed concrete conveyed to center of the job.

Quicker, Easier to Erect and Move

Sections are 10 ft. each, with self-locking joints. Supports are adjustable for height. Everything nests up nicely for transport. Two men can handle any part.

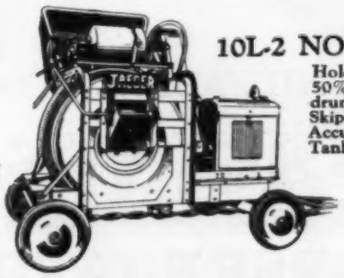
Built in two sizes. Outfit A fits 5S to 10S mixers: Outfit B is for use with ½ yard mixers. Outfit can be furnished for spouting, floor hopper or material cage and platform work.

JAEGER



7H-4 Hoist-Tilting Mixer Combined

One man control saves one engine and one operator; gives you Jaeger mixing efficiency and speed with heavy duty hoist, foot brake and safety ratchet.



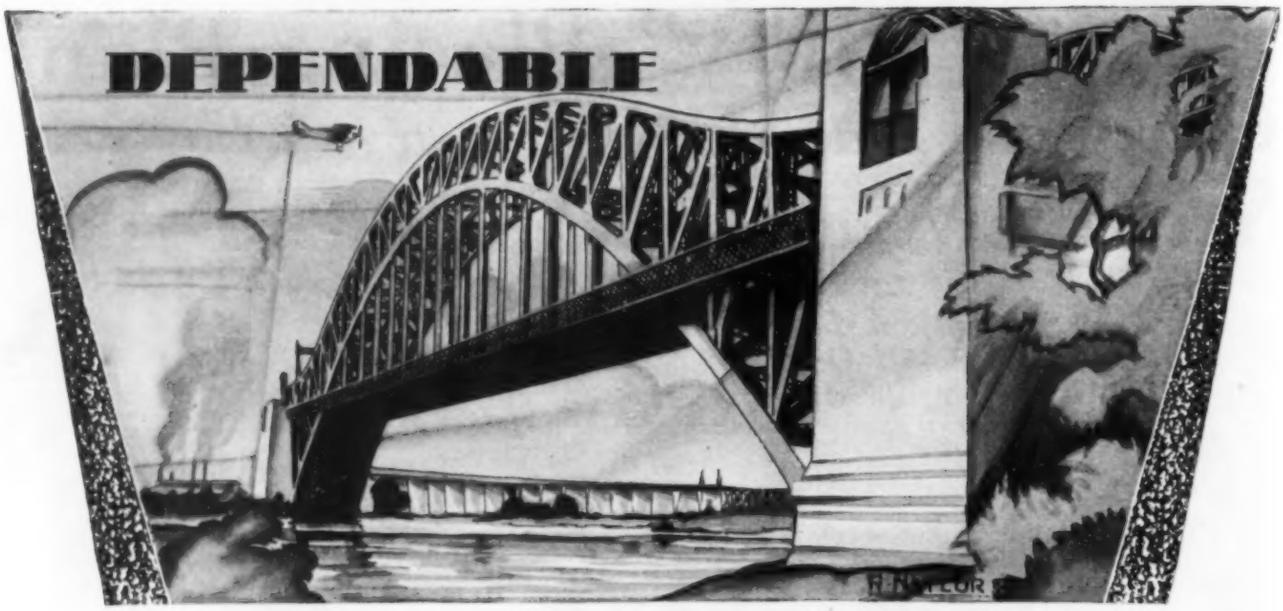
10L-2 NON-TILTING MIXER

Holds 2 Bags, 1-2-5 mix. All steel, 50% stronger, ½ ton lighter. Big drum openings and Automatic Skip Shaker increase speed, Accurate Measure Water Tank.

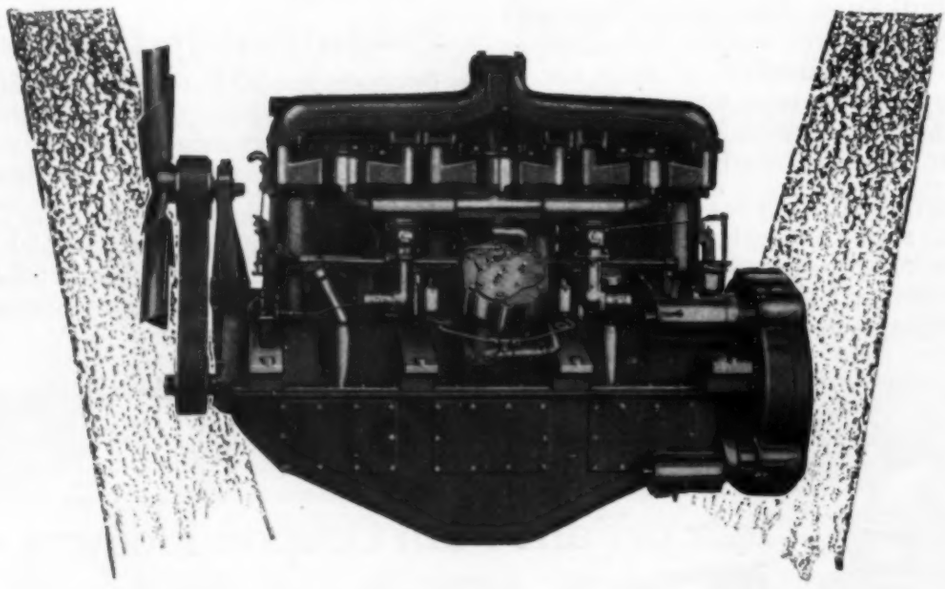
GET BIG CATALOG, JAEGER MIXERS 3½ to 28 Ft. Sizes

Tear off and Mail Coupon Today

THE JAEGER MACHINE CO. Date
800 Dublin Avenue, Columbus, Ohio
Please send catalog, prices and terms on Placing Plant and Combined
☐ Tilting Mixers and Hoist ☐ Non-Tilt Mixers
Name Address City State



Bridging the gap — and how securely. Its very design and massive build is indicative of its DEPENDABILITY. Its structure reflects its strength. Many times its own weight will pass over it with every CONFIDENCE ... In the construction field — Le Roi Power stands for such DEPENDABILITY. It gives year in and out dependable service and stays active longer. Its performance is proof. Look to the Le Roi for DEPENDABLE POWER and know it by what it does.



LE ROI COMPANY, MILWAUKEE, WIS.

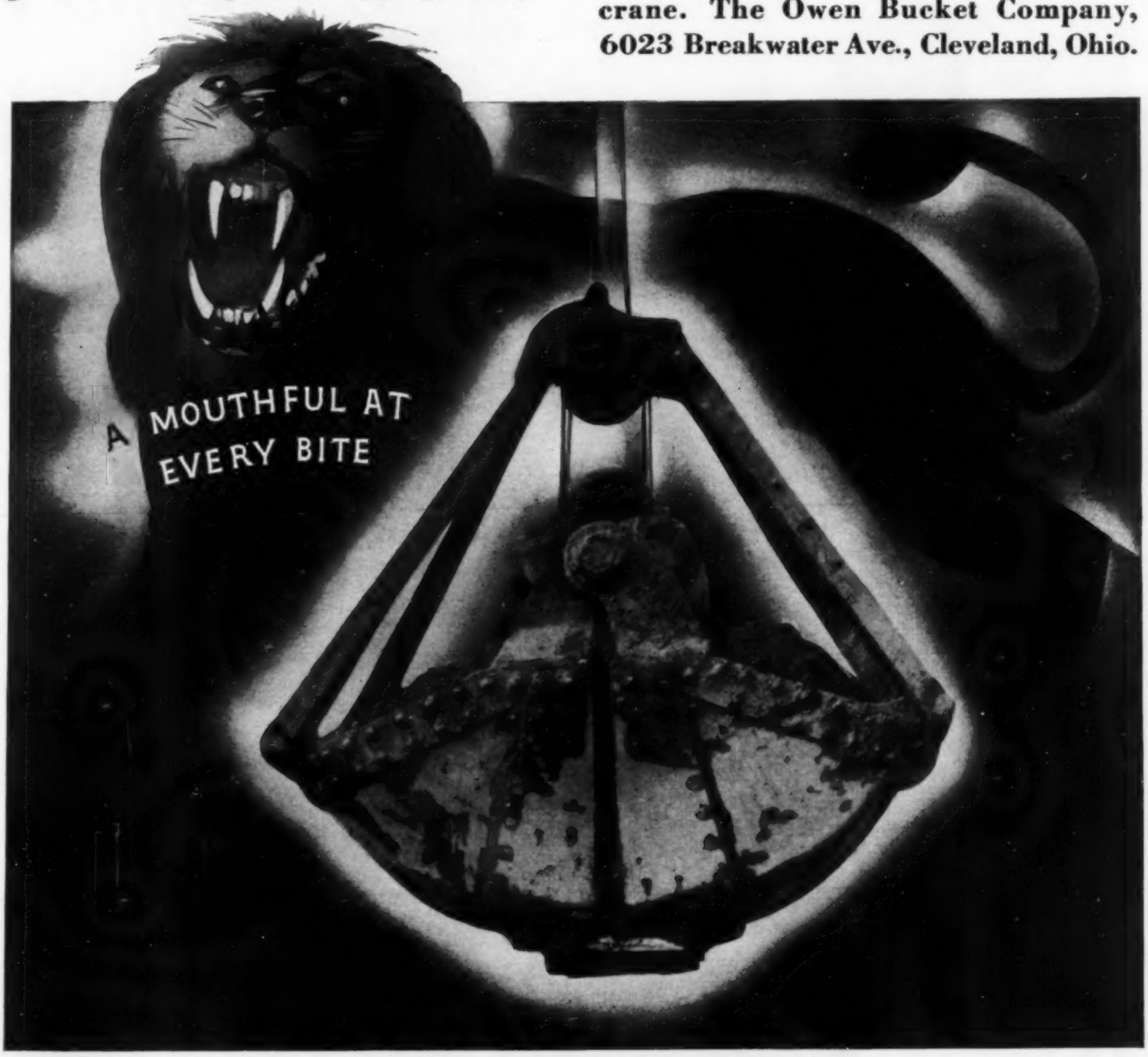
LE ROI ENGINES

3 *to* 160 HORSE POWER

Extra strengthening and wear-resisting advantages have been incorporated in the improved Owen "D" Heavy Duty Bucket to fit it for a long life of hard, heavy work. Extra heavy renewable jaws, reinforced shells, braced arms, grit-proof lubricated bearings . . . these are but a few of the construction features that give the Owen "D" its unusual stamina to "stand the gaff" of its exceptional digging ability.

The Owen "D" is the Lion of all Owen buckets—fears nothing—conquers any job no matter how hard the material, and gets what it goes after—"A Mouthful At Every Bite"—making good the Owen Guarantee of "A Bigger Day's Work."

Write for the new Catalog showing the complete Owen line—a bucket for every purpose and for every make and size of crane. The Owen Bucket Company, 6023 Breakwater Ave., Cleveland, Ohio.



OWEN CLAMSHELL BUCKETS INSURE A BIGGER DAYS WORK

Owen Buckets

The NAT'L DEMOCRATIC CONVENTION HALL

Erected by a Universal – saving $75 a day!

THE ROOF of this 260 ft. x 360 ft. wooden building, at Houston, Texas, which will house the National Democratic Convention in June, was erected in 10 days (18 days ahead of schedule) by this Universal Crane, saving in addition to 18 days' time, approx. $800.00 to $1000.00 in labor alone, not to mention replacing a slower, cumbersome stiff-leg derrick.

A. M. Carson, Supt., estimates daily savings from 25% to 200%, depending on the type of work and material handled. For instance, 140,000 bd. ft. of roofing lumber was hoisted in but 10 hours, using the crane with a 65-ft. boom.

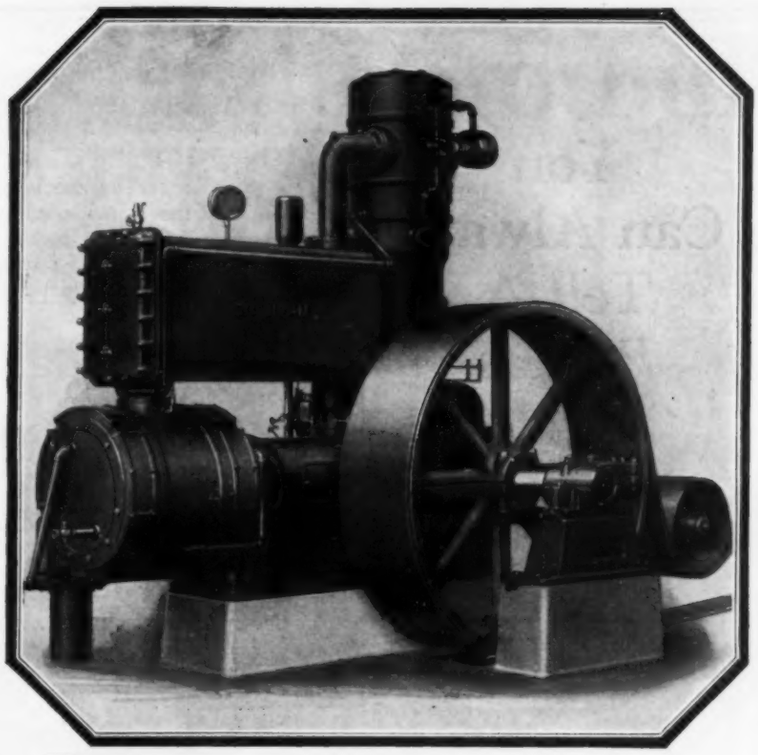
The next day, 4 miles away on the outskirts of town, this same Universal was busy digging a 1400-yd. excavation with equally typical money saving performance. A hundred and one jobs where Universals make similar savings are given in Bulletin 36-F. *Send for it!*

THE UNIVERSAL CRANE CO.

999 Swetland Bldg., Cleveland, Ohio

12 Ft. Timber
Longest Used
On 120 Ft. Span.
Read how a Lamella Trussless Roof was used on this Building, in the May Issue of "CRANE SERVICE NEWS." Write on your business letterhead for your copy.
UNIVERSAL

"We Need a New Air Compressor"



Say, Riley—

"I see we're going to need an air compressor for that new contract. Give me your recommendations by Monday—will you?"

"No need to wait till Monday, Mr. Brown. I can tell you right now why we can't beat Angle Compounds.

"All this talk about efficiencies, controls, and other technical features is all right; but what we want is dependable air power at low cost.

"And cost includes power, installation, floor space and maintenance."

But Riley—

"How can one compressor beat all the others on every count? That's unusual."

"Sure it's unusual. So is the compact Balanced 'Angle Compound' design. We can set up an Angle Compound in a hurry; it doesn't need much room; and it doesn't need large and costly foundations.

"I've seen dozens of Angle Compounds: and they run so smoothly I've often balanced a coin on the frame, under full speed and load. No wonder the first ones, installed more than fifteen years ago, are going strong today.

"As for power economy——"

"Never mind that now, Riley; you've got me interested; let's send for that Sullivan Engineer."

BALANCED ANGLE COMPOUND — SULLIVAN

All features of Sullivan Angle Compound Compressors work in harmony to give you the lowest possible cost per unit of air compressed.

To Know Angle Compounds Is to Choose Them. Why Not Send the Coupon for the Catalog Today?

SULLIVAN TRADE MARK

SULLIVAN MACHINERY COMPANY
168 South Michigan Ave., Chicago

Send me without obligation, Catalog 83-A

*Name*_____ *Title*_____

Company _____

*Address*_____

SULLIVAN MACHINERY COMPANY 168 So. Michigan Ave., Chicago

You Can Always Tell A Rogers By The "Gooseneck"

ROGERS BROTHERS CORPORATION

Albion, Pa.

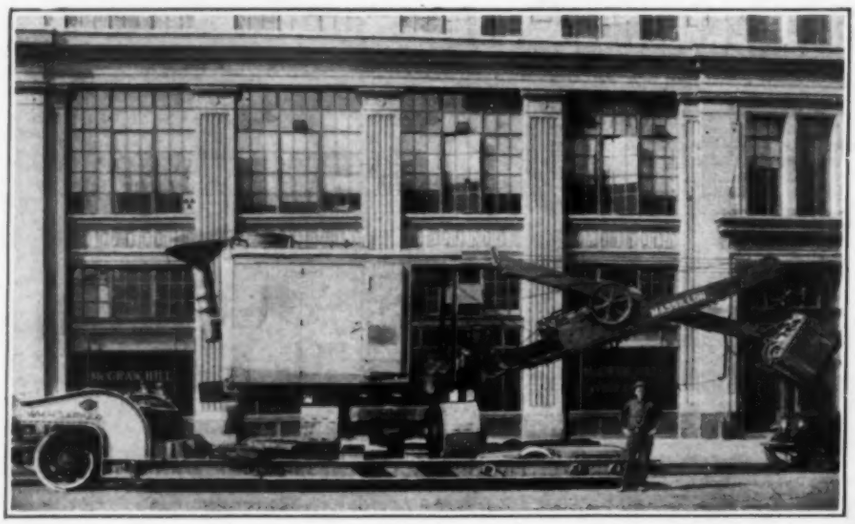
IT'S the feature that distinguishes Rogers from the crowd. It's the feature, too, that makes possible the 90 degree turning radius.

Add to this Rogers' unusual road-ability—due to the 8 inch oscillation of the rocking axles that levels out uneven roads—tremendous strength, ease of loading, speed of moving.

Then you'll appreciate why there are more than 3200 Rogers Light and Heavy duty trailers in this country and abroad.

Whether 4, 6 or 8 wheels; 1 or 100 tons, a Rogers is easy on loads, roads and expense.

Write



What BATES Customers Say

"We have used a Bates Tractor for several years and this year have given it exceedingly hard usage and it has stood up remarkably under the overload." An Illinois Contractor.

"The strongest tractor for its size used in this country. Its size and construction is such that you can turn it around in a very narrow road, which is a great advantage due largely to the long crawlers." A Maryland Contractor.

"The extra long crawlers give it a great advantage over the others." A Tennessee Contractor.

"There has been a minimum of repairs, and the gasoline and oil consumption is most satisfactory."

WRITE FOR NEW CATALOG.

BATES MANUFACTURING CO., Joliet, Ill., U. S. A.

ESTABLISHED 1883
Pioneers in the Tractor Industry

3 Sizes

Bates 28. **Made for 8-ft. graders and equipment of similar capacity.**

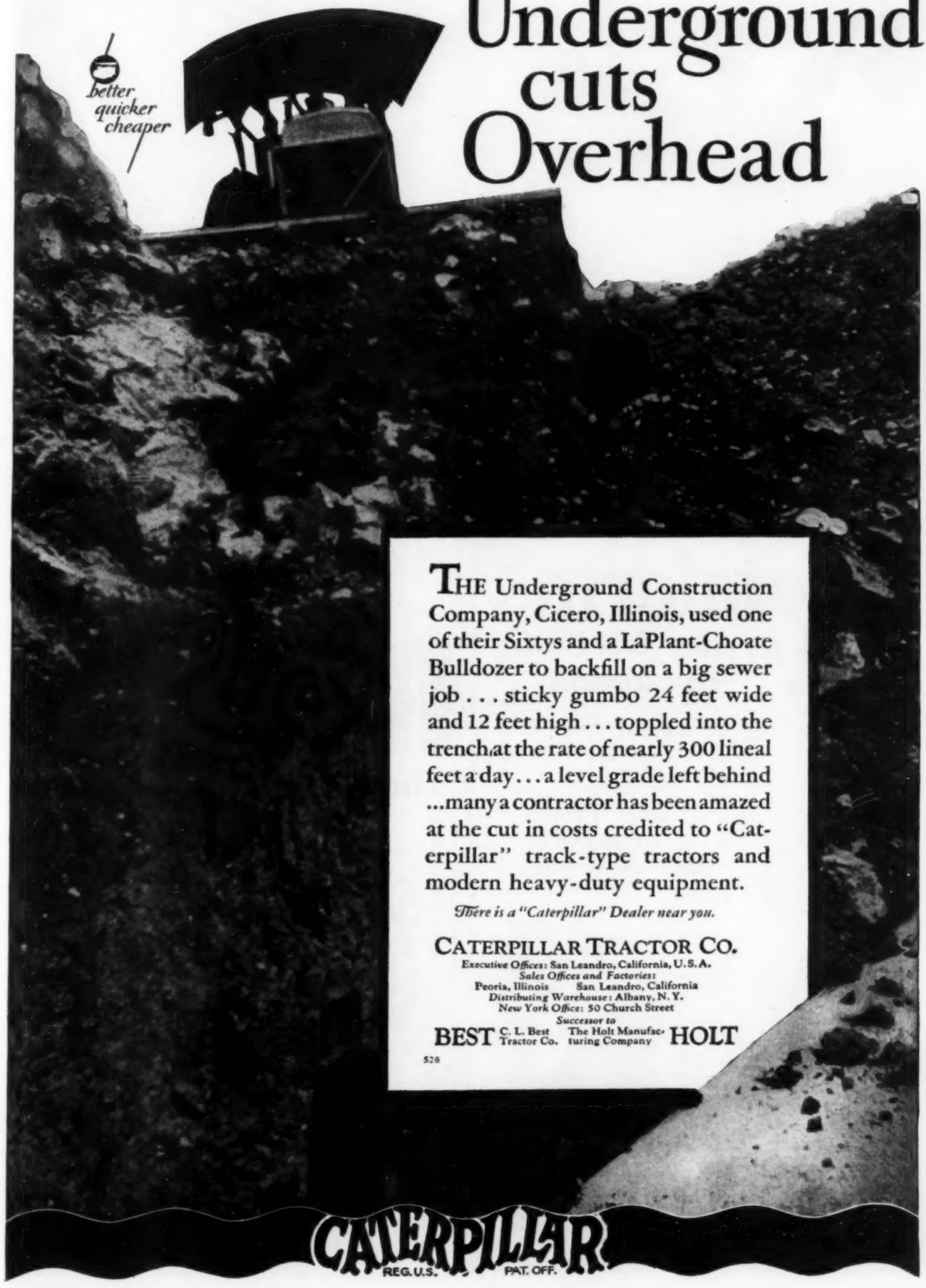
Bates 40. **Made for 7-yd. crawler wagons, 10-ft. graders, etc.**

Bates 70. **Made for 12-ft. graders and any of the largest tractor tools.**

The BATES 70
operating 12-ft. grader

Underground cuts Overhead

better quicker cheaper



THE Underground Construction Company, Cicero, Illinois, used one of their Sixtys and a LaPlant-Choate Bulldozer to backfill on a big sewer job . . . sticky gumbo 24 feet wide and 12 feet high . . . toppled into the trench at the rate of nearly 300 lineal feet a day . . . a level grade left behind ...many a contractor has been amazed at the cut in costs credited to "Caterpillar" track-type tractors and modern heavy-duty equipment.

There is a "Caterpillar" Dealer near you.

CATERPILLAR TRACTOR CO.

Executive Offices: San Leandro, California, U. S. A.
Sales Offices and Factories:
Peoria, Illinois San Leandro, California
Distributing Warehouse: Albany, N. Y.
New York Office: 50 Church Street

Successor to

BEST C. L. Best Tractor Co. The Holt Manufacturing Company HOLT

528

CATERPILLAR
REG. U.S. PAT. OFF.

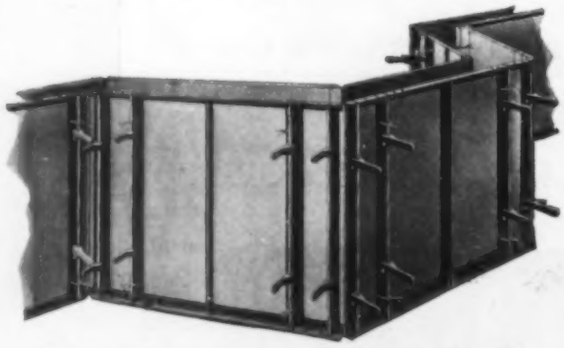
Why do you pay good money for skilled carpenters to build clumsy forms with costly wood . . . when you can get

Metaforms

for every form building requirement

That go up—and come down—job after job, in half the time with none of the waste.

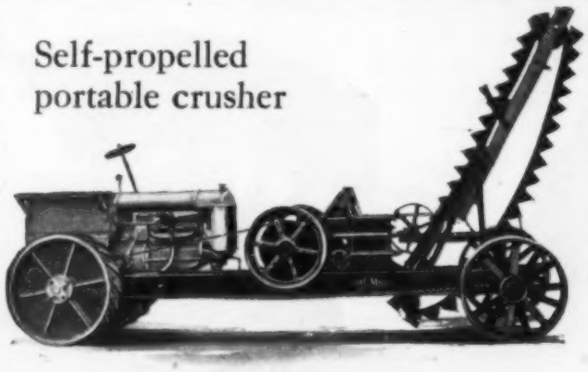
Sure they're adaptable. Projections, angles, and curves can be formed as readily as straight wall construction.



Let us tell you just what you can do with Metaforms.

METAL FORMS CORPORATION
Milwaukee, Wis.

Self-propelled portable crusher



ACME Crushers

THERE are Acme Stone Crushers suited to practically any stone crushing job. Portable or stationary.

The self-propelled portable crusher shown here is a big time and money saving unit. Can be moved under its own power direct to any stone supply along the road and then put immediately to work by a single shift of the clutch. Users say Acme Plants can't be beat for field and road work.

We manufacture a complete line of Crushers, Rollers and Graders. Ask for Catalogs.

Acme Road Machinery Co.
Frankfort, N. Y.

ROLLERS

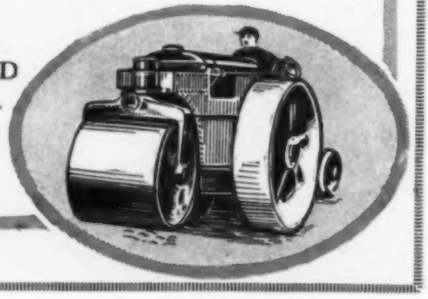
The Up-to-dateness of the BUFFALO SPRINGFIELD

accounts for the nation-wide preference of street and road builders for this particular make of equipment. That this preference actually does exist all over the country may be verified very quickly by anyone inclined to make a survey of the roller equipment in use in his particular section of the country.

Buffalo-Springfield jobs are designed to meet all sorts of conditions and are built in many models and sizes.

Scarifiers and other special attachments optional. Write

THE BUFFALO-SPRINGFIELD ROLLER CO.
Springfield
Ohio



Cletrac

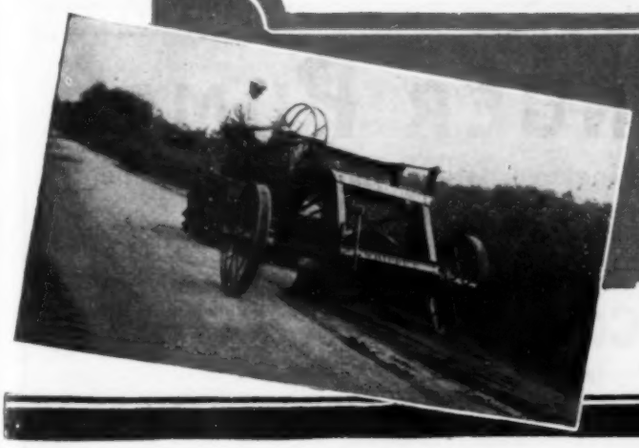
When Roads Need Repairing!

SUMMER traffic is again taking its annual toll from America's roads and highways. And again the work of maintenance becomes the all-important job.

This year, in greater numbers than ever before, CLETRAC Crawler Tractors are being swung into action—in large fleets and in single unit patrols. Theirs is the service of keeping roads and highways smooth and safe — and of making road appropriations go farther and last longer.

Wherever CLETRACS are used they seldom fail to establish new standards of *speed, power and low cost operation.* Built in a complete line—20, 30, 40 and the super-powered CLETRAC 100. Write for folders and complete information.

The Cleveland Tractor Co., Cleveland, Ohio



This Huge School is Waterproofed with "ANTI-HYDRO" and Guaranteed Dry for FIVE Years

ANTI-HYDRO
FOR PERMANENT CONCRETE
HARDENS WATERPROOFS

A carload of "ANTI-HYDRO" (3300 gallons) was used to waterproof the foundations, walls, floors and swimming pool through the mass of concrete of this Two-and-a-Half Million Dollar school building.

A cheap substitute for "ANTI-HYDRO" had been approved by the architects and could have been bought for one-half the cost of "ANTI-HYDRO." This substitution would have meant a considerable saving for the contractor.

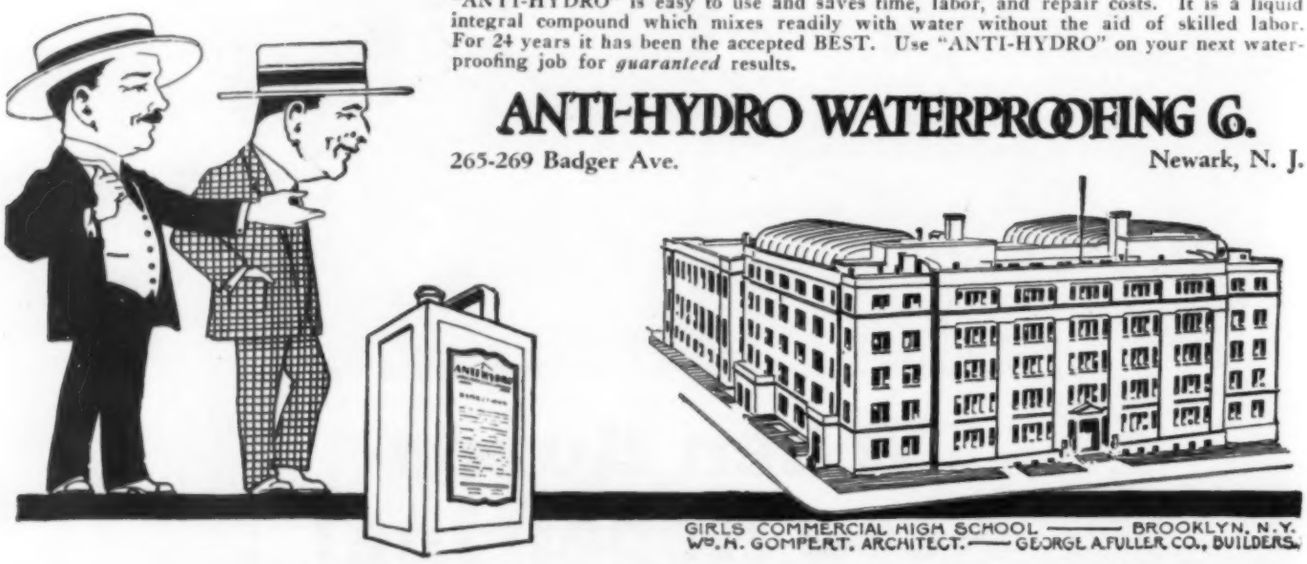
But—

The contractor insisted on a guarantee of a waterproof job which the manufacturer of the cheap substitute refused to give.

"ANTI-HYDRO" was then used and the job was guaranteed to remain watertight for FIVE Years.

You may pay more for "ANTI-HYDRO," but the first cost is the last cost. Cheap substitutes are a false economy—and always cost more in the end.

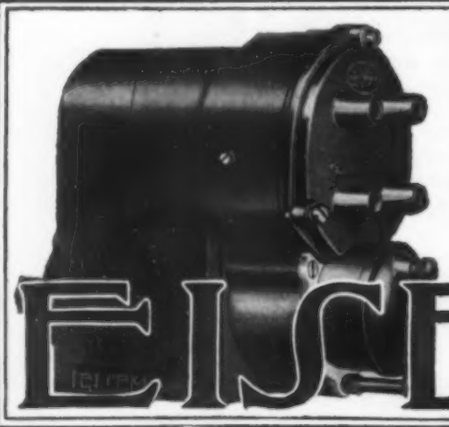
"ANTI-HYDRO" is easy to use and saves time, labor, and repair costs. It is a liquid integral compound which mixes readily with water without the aid of skilled labor. For 24 years it has been the accepted BEST. Use "ANTI-HYDRO" on your next waterproofing job for *guaranteed* results.



GIRLS COMMERCIAL HIGH SCHOOL —— BROOKLYN, N.Y.
WM. H. GOMPERT, ARCHITECT. —— GEORGE A. FULLER CO., BUILDERS.

ANTI-HYDRO WATERPROOFING Co.

265-269 Badger Ave. Newark, N. J.



The Preferred Magneto
~for Construction Equipment

EISEMANN

The overwhelming choice of the builders of high quality equipment. Favored by contractors everywhere.

EISEMANN MAGNETO CORPORATION
165 Broadway - New York

EISEMANN

HUMDINGER PUMPS

Non-clogging, everlasting rubber ball valves, totally enclosed, running-in-oil jacks, bronze bushed bearings, all steel trucks, and enclosed engine crank cases make HUMDINGER PUMPS.

THE CONTRACTOR'S CHOICE

Full detail description given in Bulletin No. 1034 CM. Send for a copy.

RALPH B. CARTER CO., 126 Chambers St., New York
Factory: Hackensack, N. J.

"Everything is 'Oil Right'—

Good Roads MACHINERY

—with a Champion Distributor"

Write for New Bulletin.

Standardized equipment especially made to fit your truck. Champion Distributors show a bigger return on each dollar invested.

The Good Roads Machinery Co., Inc.
Kennett Square, Pa.

Chicago New York Philadelphia Pittsburgh Watertown, Mass.

These Advantages Mean More Concrete per Day

- Low, wide hopper—easier to charge.
- Back to charging position faster—more batches in less time.
- Discharges dry or wet concrete easily and completely.
- The same proven design as in Smiths that pour the world's largest projects.

Only a Smith has the double cone drum that requires but a short pull of the handle to discharge—and drops back into charging position in a second. The drum rides on rollers—smooth running, no punishing strains, and the batch is always balanced at the center.

Among small mixers, only a Smith has a charging hopper—a hopper that is low, wide and easy to shovel into. Men work faster and "stay on the job" because of this easier shoveling. Because of all these Smith advantages you get jobs done far quicker—and you can do many more jobs a month.

The BIG Projects are "Smith-Mixed"

The best construction and engineering talent in the country run the big jobs. These men choose Smiths—and in small Smiths you get the same thorough mixing action, the same speed of discharge, the same smoothness and dependability that these leading construction experts have found in the big models. A 2½-S, 3½-S, 5-S or 7-S Smith will give you more profits—in greater production, freedom from trouble and longer life.

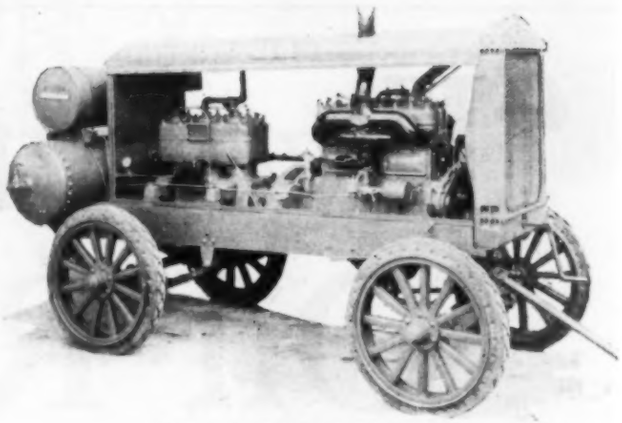
The Only Small Mixer with Charging Hopper

Have a Smith THIS Year!

Let Smith dependability start working for you now—on *this* year's work. Because a Smith is the finest mixer you can buy does not mean it is higher in price. Write for the big *new* Smith catalog No. 528, and *new* prices.

The T. L. SMITH COMPANY
1084 32nd St., Milwaukee, Wis.
Sales Offices and Service Stations in all Principal Cities

SMITH MIXERS



Price F. O. B. Factory on Schramm Spring Trailer $1850.00, on regular Highway Trailer $1982.00.

Most complete range of sizes and types!

(15 to 360 cu.ft. per Minute)

Why "SCHRAMM" Is Preferred

1. Operated by vertical-cylinder heavy duty Buda Engines.
2. Compressor parts are interchangeable.
3. Greater capacity per dollar invested.
4. Heavy-duty self aligning Clutch.
5. Engine starts without compressor load.
6. Visible Gasoline Strainer.

THE Schramm Compressor line is complete—the most complete available.

There's a type and size of Schramm Compressor for every purpose — rock drilling, paving breaking, caulking, spading, tamping, riveting, steel drilling and many other purposes. Every type of mounting can be had—truck, tractor, trailer and skid.

Schramm also furnish all necessary air operated tools—drills, drill steels, paving breakers, riveting hammers, etc.

Complete particulars on entire line in the 1928 Schramm catalog. ***Send for your copy.***

SCHRAMM, INC.
West Chester, Pa.

Offices and Representatives in all Important Cities

Schramm

The Famed Witch-Elk Engineers' Boot

Smoked Elk uppers, waterproofed. Wing tip. Full leather lined. Full Bellows tongue. Heavy oak outsoles, waterproofed. Chrome middle soles. Flange heel.

He Couldn't Wear A Hole in Them!

Read what this engineer* from the Yukon Territory says of the famed Witch-Elk Engineers' Boot. It is just one of hundreds of friendly, unsolicited testimonials we have in our files:

Mayo, Yukon Territory, Canada.

"Several years ago I bought a pair of your shoes at Cochrane, Ontario, and used them part of one season there and three seasons in this northern section. They wear just like a human being . . . . they started to wear on the inside. I just couldn't wear a hole in them for three years and resurrected them this year, removed the lining, and I am finishing up this season wearing them in a blaze of glory. I would like another pair."

Witch-Elk boots have the intestinal fortitude to stand any racket you give them . . . on rocks, in the marshes, wherever the going is rough. Flexible, durable, comfortable, they are made particularly for engineers.

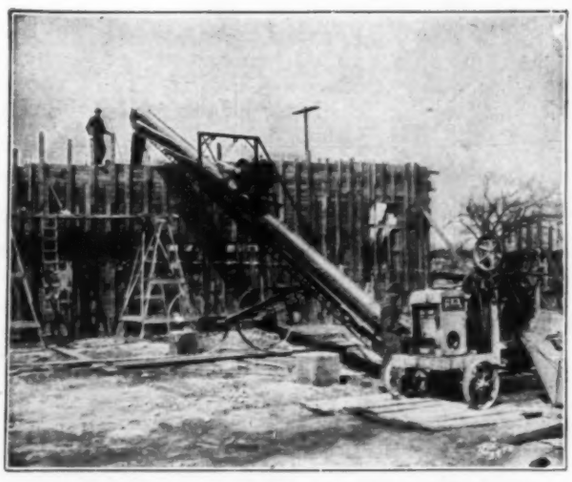
At your dealer or write us direct for our new booklet in color describing these boots.

WITCHELL-SHEILL COMPANY, Detroit, Mich.

World Wide Reputation—On Fields of Recreation

*Address on request.

Northerns Do the Work Better Because They Are "Built Better" *That's Why*



Northern Conveyor on swivel trucks placing mixed concrete.

There is a Northern Conveyor of the Right Type and Size for Every Contracting or Material Handling Operation!

You can Unload or Load with a Northern—Place Mixed Concrete—Back Fill Trenches—Handle any or Every Material in any way Faster and Better than with any other Machine on the market.

Let Us Send You Complete Information

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Northern BUILT BETTER Portable CONVEYORS

NORTHERN CONVEYOR & MFG. CO.,
Janesville, Wisconsin, Box X
Send catalog on Northern Conveyors.
Name .....
Address .....
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Deep Sewer Trenching the more profitable way

HERE you see the Bay City 16-B ¾-yd. 20 ton Convertible Excavator, equipped with trench bucket, digging a deep sewer trench near Port Reading, New Jersey. It is owned by George Miller, Fords, N. J.

This sewer runs under the Reading Railroad tracks, which can be seen in the picture. The hoe-type action of the bucket permitted the machine to dig part way under the track, so that very little hand tunneling was necessary. The machine picks up the hard asphalt surface easily, after it has been notched along the side.

The 16-B Excavator is convertible to skimmer, trench scoop, dragline or crane buckets. Full crawler mounting, great speed and power. All steel construction. Eastern service station at Roselle, N. J. *Write for Bulletin.*

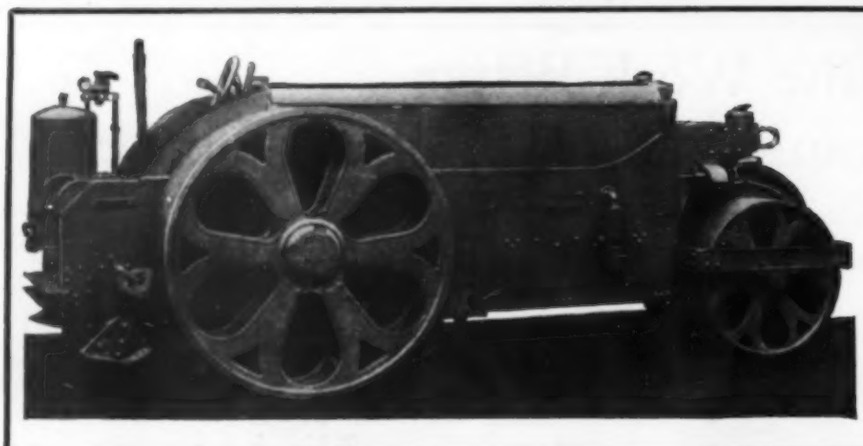
BAY CITY DREDGE WORKS

New York Office
302 Broadway

BAY CITY, MICH.

BAY-CITY

Full or part CIRCLE — SHOVELS — CRANES — EXCAVATORS



HUBER

4 CYLINDER

MOTOR ROLLERS

Powerful and dependable, quick in action, economical to operate. Made in 4 sizes (5-7-10-12 Tons). Send for Huber Motor Roller Catalog.

THE HUBER MFG. CO.
315 E. Center St., Marion, Ohio

No. 108

Just the Glove for Bridgemen

Bridgemen's Special—canton flannel back, six inch canvas cuff, protected sides and fingers, Sabin's famous hold tight back.

A long wearing, comfortable glove that stands just as much hard work as you can.

Price $1.35 per pair—send check, draft, or money order.

Sabin Co.,—Gloves
536-40 W. Federal St., Youngstown, O.

Sabin Co.,—Gloves
536-40 W. Federal St.,
Youngstown, Ohio

Send me information on Sabin Gloves

Name .....

Address .....

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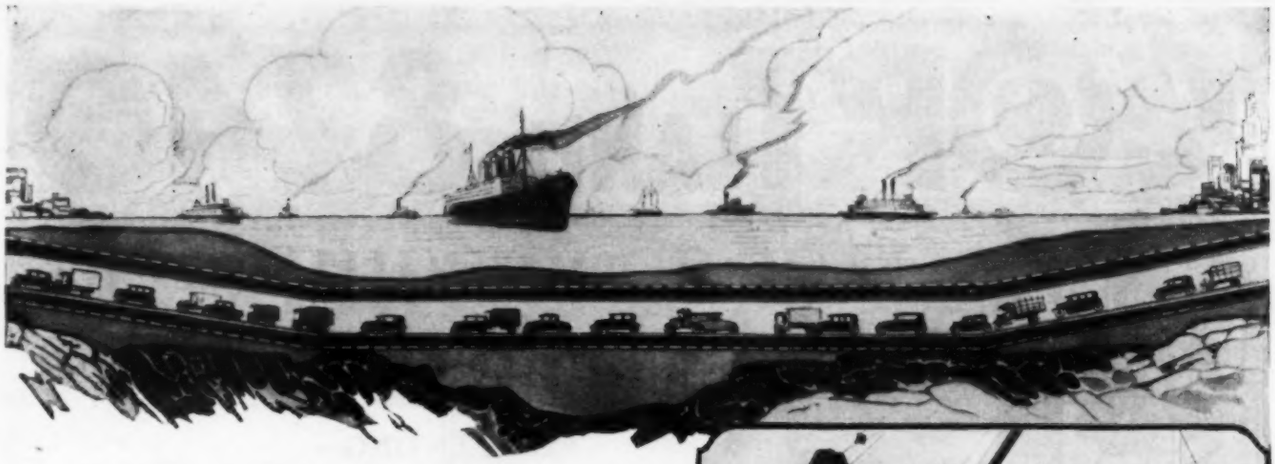
If you wish a pair of No. 108 Gloves enclose $1.35 and check here ☐



The highway under the Hudson

ANOTHER great engineering feat has been completed—the world's largest under-water tunnel, a highway 9,250 feet long connecting New York City and Jersey City, N. J. Such a feat, unbelievable 50 years ago has been made possible by modern engineering equipment.

Excavations for the approach, the sinking of caissons for ventilation were engineering problems in themselves, and Hayward Orange Peel and Clam Shell Buckets did the lion's share of this work.

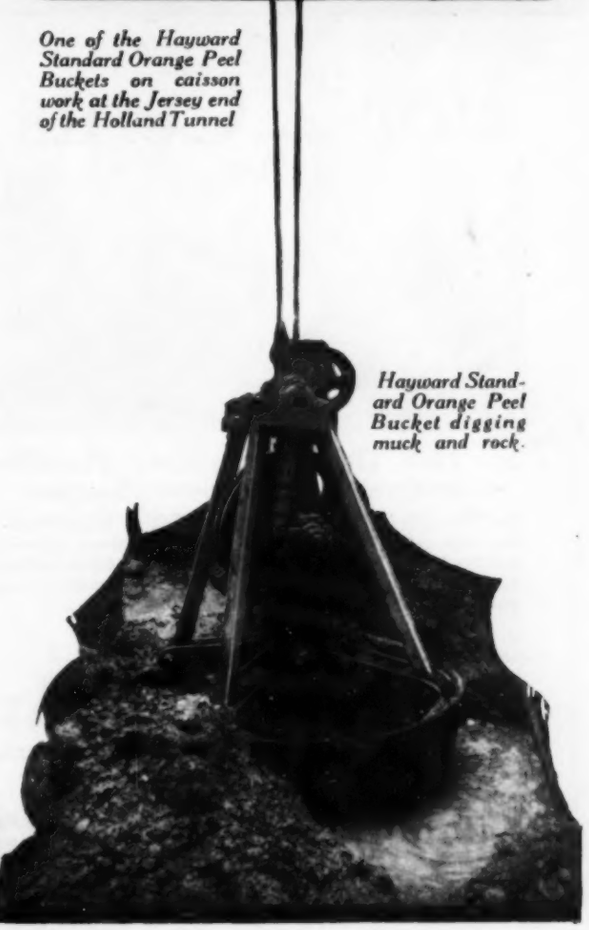
Hayward Buckets were selected by the contractors because they know from experience that Hayward Buckets can be depended upon to maintain a definite schedule of excavation. They know that these buckets dig in, fill and dump quickly and stand the gaff of continuous service.

THE HAYWARD COMPANY
48-50 Church Street, New York, N. Y.

Builders of Clam Shell, Orange Peel, Drag Line and Electric Motor Buckets; Dredging, Excavating, and Coal Handling Machinery; Automatic Take-Up Reels; Counterweight Drums.

HAYCO

One of the Hayward Standard Orange Peel Buckets on caisson work at the Jersey end of the Holland Tunnel



Hayward Standard Orange Peel Bucket digging muck and rock.

Hayward Buckets

CORTLAND 8240

for good equipment backed by real service

REPRESENTING—

Koehring Co. Insley Manufacturing Co. Blaw-Knox Co. Clyde Iron Works. C. H. & E. Mfg. Co. National Brake & Electric Co. Bay City Foundry & Machine Co. Huber Manufacturing Co. Handy Sack Baler Co.

R. E. BROOKS CO.

EQUIPMENT for CONTRACTORS

50 CHURCH ST. NEW YORK CITY

For 2 Cents

See How Other Contractors Handle Wet Concrete—Faster—Cheaper

Send for a copy of the new "Wet and Dry" folder showing how other contractors eliminate expensive chutes, towers, hoists, barrows and a gang of men for handling wet concrete from mixer to forms. The coupon will bring you a copy by return mail. Send it in now.

Name .....

Address .....

City ..... State .....

Company .....

BARBER-GREENE CO. 530 W. Park Av., Aurora, Ill.

BARBER GREENE

Portable Belt Conveyors Self Feeding Bucket Loaders

THE MILBURN LIGHT

Prove to Yourself

Some of the Efficient Features found in the

No. 8 MILBURN LIGHT

1. Operates at a cost of only 3½c. per hour.
2. It uses ordinary lump or cake carbide.
3. It cannot be overcharged.
4. It is practically self-cleaning.
5. It wastes no gas.

Made in sizes from small hand lamps up to 24,000 candle-power.

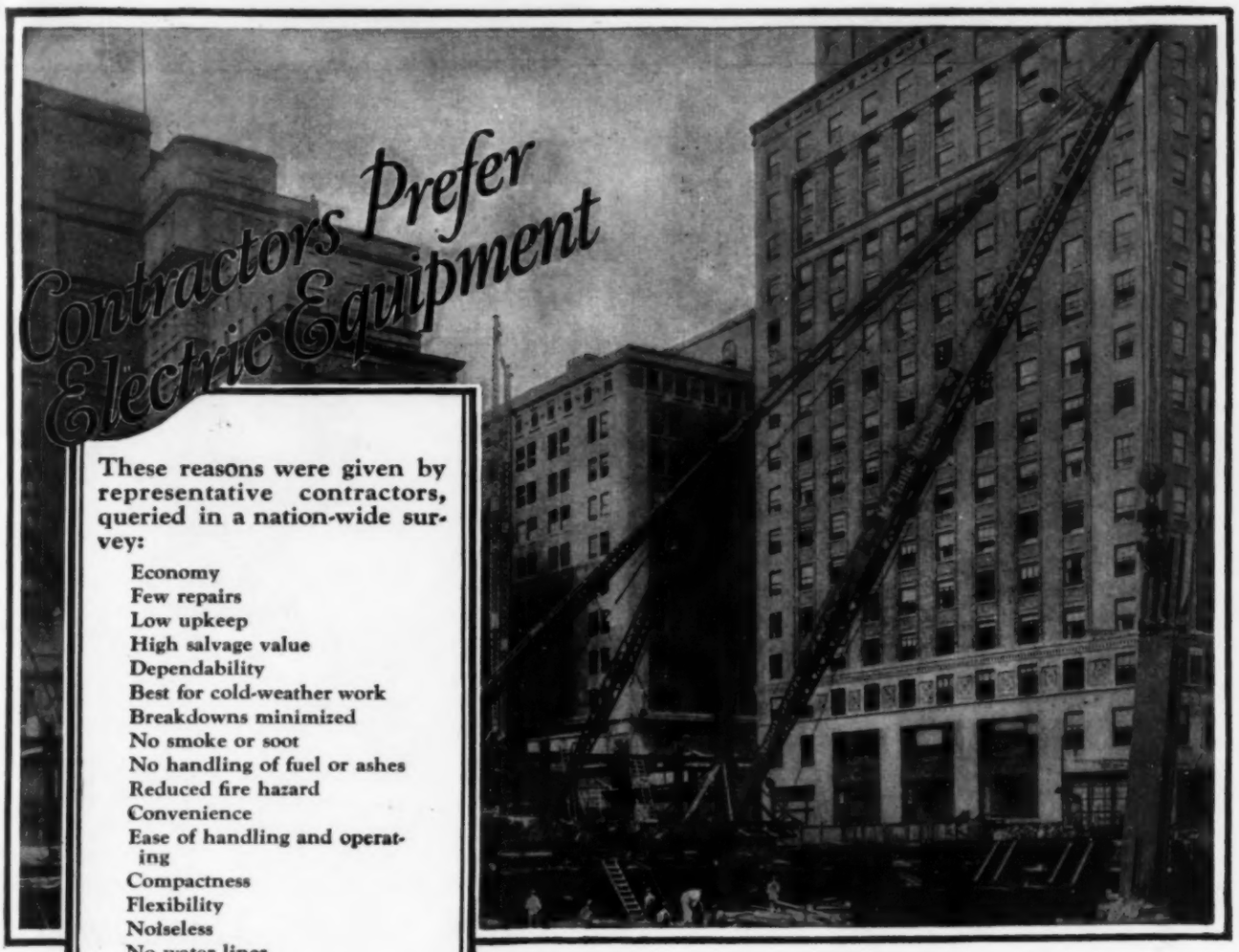
Write for Booklet 269 NOW!

The Alexander Milburn Co.

1416-28 W. Baltimore St.

Baltimore, Maryland

Stocks and Distributors in Principal Cities



These reasons were given by representative contractors, queried in a nation-wide survey:

- Economy
- Few repairs
- Low upkeep
- High salvage value
- Dependability
- Best for cold-weather work
- Breakdowns minimized
- No smoke or soot
- No handling of fuel or ashes
- Reduced fire hazard
- Convenience
- Ease of handling and operating
- Compactness
- Flexibility
- Noiseless
- No water lines

In the operation of

STIFF-LEG DERRICKS

This stiff-leg derrick—a product of the American Hoist and Derrick Company—was used by the McClintic Marshall Company in the construction of the New York Central Building, New York City. It was operated by G-E Motorized Power.

The McClintic Marshall Company is one of the many nationally known contractors who not only employ electricity on their projects, but utilize it most effectively through G-E Motorized Power.

—and other contractors say

"We are using more motors in our construction work each year and always use electric power when we can get it, because the installation is cheaper, repairs are less, service is more dependable, and salvage value is higher." H. Stanley Bent, Vice President and General Manager, Bent Brothers, Inc.

"The job superintendents, at all times, prefer electricity. For our large hoists and mixers we always use electricity, except where no current is at hand." E. J. Burrus, Superintendent Yards and Shops, Barney-Ahlers Construction Company.

Motorized Power
—fitted to every need

200-171

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Mud means nothing to the Starrett Stainless Steel Tape

The tape you can always read

No matter how much dirty work you give a Starrett Stainless Steel Tape — in mud, salt water or tunnel work—the figures will remain as bright and clear as when new. No scouring necessary—simply run the ribbon through a cloth to remove the grit.

Your dealer will show you the Starrett No. 521 Stainless Steel Tape, graduated in feet, tenths and hundredths of a foot, or the No. 520 Tape, with graduations in feet, inches and eighths of an inch—50 or 100 ft. lengths.

Write us for further information and free copy of the Starrett Catalog No. 24 "NF."

Starrett Engineers Reel Tapes Nos. 536-537
Made in 2 widths and 6 lengths from 25 to 100 ft., with nickel frame, rosewood grip handle, and folding winding handle. Tape is detachable from reel.

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
ATHOL, MASS., U. S. A.

Use Starrett Tools

L7100

The BEST at *any* Price!

KOLESCH Construction Transit
No. 7721

PRICE $160

This Transit is designed to meet the most exacting requirements of the Construction Engineer, and is *Kolesch Quality* throughout.

KOLESCH & COMPANY
138 Fulton St., New York, N. Y.
Established 1885

Make more by serving more

Do your leveling and plumbing the modern, accurate way. Mistakes are always costly. By actual experience you can save an average of $2.00 a day or more on every job as a result of the speed and accuracy possible with this specially designed Beckmann level and transit.

A Genuine Beckmann
More Cannot Be Said

Beckmann instruments are known the world over. They are noted for precision and accuracy —for their sturdy construction and long life.

This model is designed for the use of builders and contractors. It cuts time and mistakes in leveling buildings, floors, walls and foundations — in running lines for fences, streets and ditches—in surveying lots and locations.

Easy to learn to use. Big volume makes the price very low

Write for our booklet "Low Priced Precision"

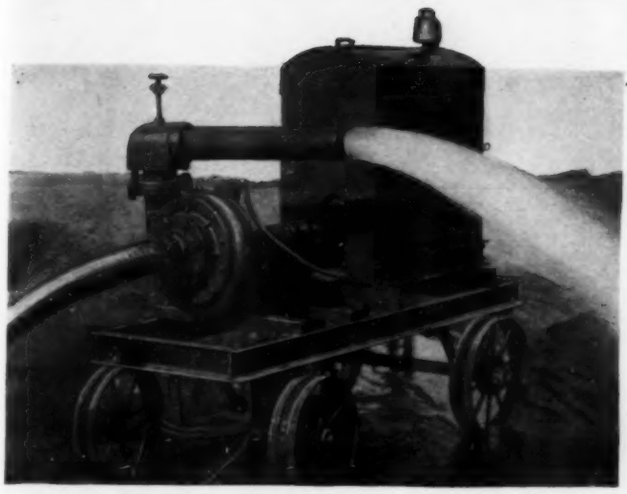
The L. Beckmann Co.,
448 Jackson St.,
Toledo, Ohio

Please send me your book, "Low Priced Precision."

Name.....

Address.....

City.....



You Can't Match This SPEED!

YES, this new American-Marsh Centrifugal Contractor's Pump is rugged, light weight, won't balk when there's mud or sand in the water handled, and is furnished complete at low price. But it's more than that. It's the only pump automatically primed in a simple, practical way.

Sixty seconds after starting the engine you're handling water—no attention required. And the pump stays primed as long as engine runs. Our patented primer is sure-fire, even in zero weather.

Eliminate those costly delays when crews stand idle while you try to prime an obstinate pump—while you try to keep it primed. Turn to our new outfit. It will save you plenty. Capacities to 72,000 gal. per hr.; suction lifts to 20 ft.

AUTOMATICALLY PRIMED
LOW PRICED
MAIL COUPON NOW

AMERICAN-MARSH

Type MEP Portable Pump

AMERICAN STEAM PUMP COMPANY
Battle Creek, Michigan

Kindly send me your Bulletin 59 describing the new Type MEP Portable Pump which is automatically primed.

CHECK BELOW IF INTERESTED

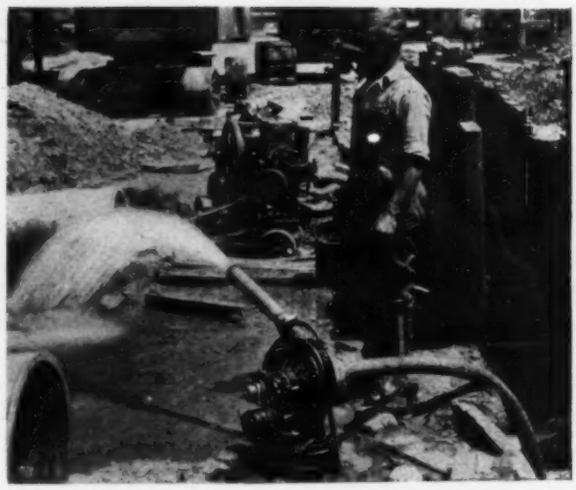
☐ Without obligation have your sales representative call.

Signed .....

Firm Name .....

Address .....

Put it on the job:



Pumps 7500 gal. per hr.
Weighs 95 lbs.

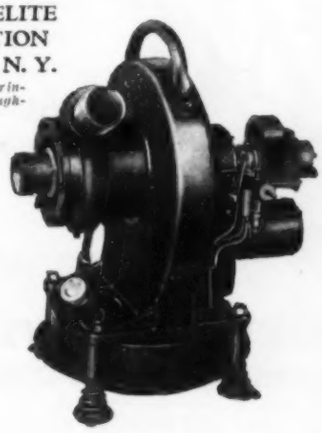
Complete with 1½ H.P. gasoline engine.

Price $225 f.o.b. factory

You never saw a better combination of capacity and portability. The maximum suction lift is 20 ft., maximum head, 50 ft., handles anything that enters foot valve strainer. Needs no foundations. Fuel tank in base holds 1 gal.—enough for 4-5 hrs. High grade construction—oversize ball bearings, Robert Bosch moisture proof magneto, air cooled motor, bronze pump impeller. It'll last for years.

A distributor near you will demonstrate—We'll tell you who he is—Write

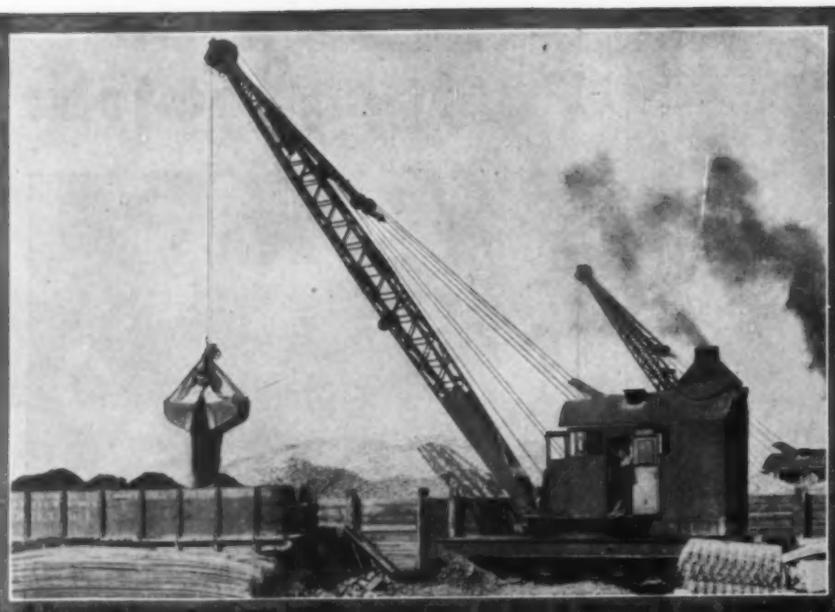
THE HOMELITE CORPORATION
Port Chester, N. Y.
Distributors in principal cities throughout the world.



Homelite

Portable Centrifugal Pump

® 2647



BROWNING Locomotive Cranes not only get more work done, and done cheaper, but their length of service is measured in decades.

Browning performance in all kinds of service is proof of the soundness of an investment in a Browning.

THE BROWNING CRANE COMPANY
16226 Waterloo Road
CLEVELAND, OHIO, U.S.A.
New York : Chicago : Pittsburgh
Birmingham
SALES AGENTS:
Portland : Los Angeles : Montreal
Toronto : New Orleans : Baltimore
Houston : Jacksonville : Boston

BROWNING

LOCOMOTIVE TRUCK & CRAWLER CRANES

STEAM ELECTRIC

Use it also as
Trench Hoe
Clamshell
Backfiller
Dragline
Crane

One Man
Gasoline
Shovel or Hoe

FUNDOM SHOVEL
Wizard of Modern Diggers

Full ¾ circle swing. ½ yard dipper water level. 16½ ft. radius with boom at 45°. Alemite lubrication. Highest class construction. Fast, powerful, rugged, efficient. Powered by a Fordson. Furnished with regular dipper bucket or with trench hoe or with boom extension.

Write us for information and name of nearest dealer.

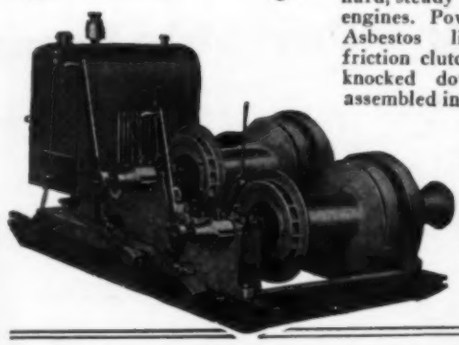
The Fundom Hoist & Shovel Co.
407 American Bank Bldg., Lima, Ohio

Hoist away! with an "O.K."

O. K. Portable Air Compressors

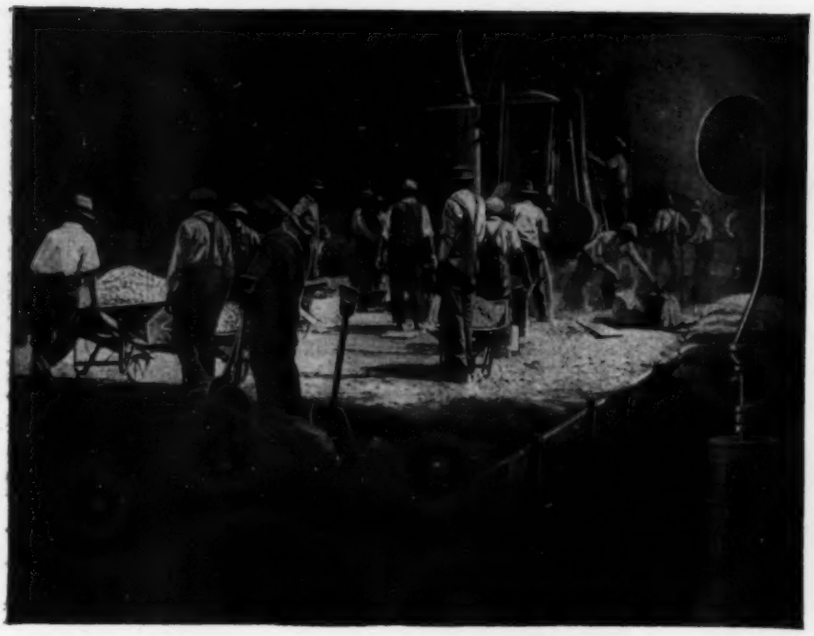
O. K. Portable Elevators

O.K. Hoists, made in several types, keep the job booming. They load and unload materials; they hoist supplies; they operate scrapers and drags; they run portable elevators; they save time on any construction job. Built to strict standards for hard, steady work. Heavy engines. Powerful brakes. Asbestos lined double friction clutches. Can be knocked down and reassembled in a lunch hour.



Owners say O.K.! and that's true. We need a few live agents. Write.

O.K. Clutch and Machinery Co.
P. O. Box 305, Columbia, Penna.



Speed up the job with Carbic light

WHEN bad weather or other causes have delayed the job and you are behind schedule, night work is necessary. Carbic light makes your night shift as productive as though working by daylight.

The Carbic Light is portable. The popular No. 2 model weighs only 115 pounds fully charged. Two men can carry it easily.

It's so simple in construction you can charge it in three minutes to burn for twelve hours. So sturdy it will give you many years of service. So economical it costs but 6 cents an hour to operate.

Thousands of Carbic Lights are in use on every sort of night construction job. For 14 years they have been helping contractors "keep up to schedule."

Your jobber can supply you.

Style No. 2

CARBIC LIGHT

OXWELD ACETYLENE COMPANY

Unit of Union Carbide and Carbon Corporation

New York City
30 East 42d Street

UCC

Chicago
Peoples Gas Bldg.

San Francisco, 8th and Brannan Streets

Carbic is distributed by the Union Carbide Sales Company through its national chain of warehouses and is sold by jobbers everywhere.

THE

LOWELL

Reversible Ratchet Wrench

Is Well Known and Widely Used

IN THE

WATERWORKS FIELD

THE 1916 PATTERN IN CLOSE QUARTERS

Here is shown one of the many ways in which **Lowell Reversible Ratchet Wrenches** are being used in the Waterworks field.

They are also used in bolting up couplings on the pipe line, in opening and closing street valves, and also in the form of **Ratchet Die Stocks,** extremely handy in the trench.

On larger operations, they are to be found among the tools of the contractor. They are used in drawing up the bands of continuous stave pipe, opening and closing the sluice gate, and many other operations.

A RATCHET WRENCH IS A CONVENIENCE AND A TIME SAVER WHEN COMPARED WITH OTHER TYPES.

LOWELL WRENCH COMPANY

54 Commercial Street

WORCESTER, MASS., U. S. A.

Tear out this coupon on dotted line above, write your name and address below, put it in an addressed envelope and let Uncle Sam and us do the rest.

Send Catalog M.

Name .....

Address .....

City ..... State.....

Company .....

Making a Wide Cut and Fill With Only One Machine on a One-man Payroll

Cost was the big problem that confronted the contractor on this job where a hill had to be cut away and the material moved into the adjacent ravine.

After looking around, the contractor finally turned to a Sauerman Power Scraper and here's what he found:

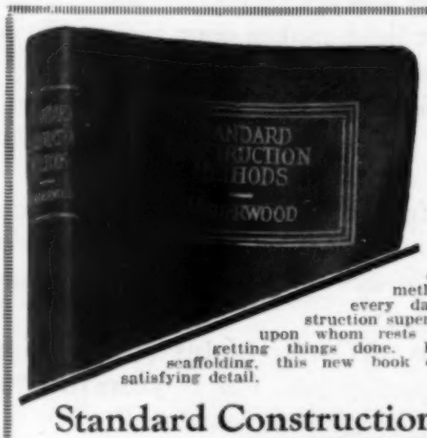
The Sauerman Scraper only required one man for operation and by digging and conveying the materials from hill to ravine in one continuous operation, it did as much work as excavating and hauling equipment combined could do.

As a result, the contractor cut his payroll, he avoided a big investment in equipment and he was able to handle the entire job at a surprisingly low cost per yard.

The job you have in mind or are contemplating doesn't have to be just like this one. Sauerman Power Drag Scrapers can handle all kinds of excavating jobs. Write for the new 96-page Scraper booklet and see for yourself how Sauerman Scrapers are cutting costs for their users.

SAUERMAN BROS., INC.

480 S. CLINTON ST., CHICAGO



How crack construction men get things done

A manual of actual construction methods; methods that *are* used every day by practical construction superintendents and others upon whom rests the responsibility of getting things done. From pile-driving to scaffolding, this new book covers everything in satisfying detail.

Standard Construction Methods

By G. UNDERWOOD

Construction Engineer

408 pages, 6x9, 327 illustrations, flexible

$5.00 net, postpaid

A real chapter on rigging and erection work. Tables of safe capacities for tackle—a new simple formula for strengths of manila and wire rope—figuring the strength of hooks and shackles—how to rig a gin pole and shears, etc., etc., etc.

CONTENTS

I.—Organization and Equipment;
II.—Excavation;
III.—Pile-Driving;
IV.—Concrete Construction;
V.—Wood Construction;
VI.—Brick Construction;
VII.—Steel Construction;
VIII.—Roofing and Flashing;
IX.—Lathing and Plastering;
X.—Scaffolds;
XI.—Erection and Rigging;
XII.—Pipework;
XIII.—Painting;
XIV.—Construction Schedules.

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You may send me for 10 days' free examination **Underwood's Standard Construction Methods,** $5.00 net, prepaid.

I agree to remit for the book or to return it, postpaid, within 10 days of receipt.

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Company ..... C.M. 6-1-28

—*no loss*

Cement Bags that empty out clean

TODAY, the saving way to use cement or plaster is to get it in Bates Multi-Wall Paper Bags. These modern containers empty out clean. The mixer receives every pound of material just as it left the mill, 100% usable and in perfect condition.

With their 5 separate walls of tough, impervious paper, Bates Bags give reliable protection from rain, atmospheric moisture and rough handling. They eliminate dusting and reduce bag breakage to a minimum. And when they've done their work, they need not be returned for credit.

Buy the cement and plaster for your jobs in Bates Multi-Wall Paper Bags and avoid loss.

BATES VALVE BAG CORPORATION
35 East Wacker Drive, Chicago, Illinois

BATES *Multi-Wall* PAPER BAGS

Bates Multi-Wall Paper Bags are made by the Bates Valve Bag Corporation in 8 modern plants throughout the country.

Is your water supply too costly?

Don't let inefficient water supply absorb hard-earned profits. Investigate Barnes Triplex Road Pump ability.

Built for high pressures, Barnes Pumps always give a steady volume of water for all operations. Distance and elevation are no barrier to Barnes consistent performance.

Many contractors have turned loss into profit by replacing inefficient pumps with the Barnes. All of these features are found only in Barnes Pumps:

1—Most simple, self-oiling system—one moving part rotary pump
2—All steel gears
3—Forged crank shaft—not cast
4—Three point suspension truck, spring mounted
5—Roller bearings on all shafts, including crank shaft
6—Water cylinders detachable from power end
7—Flexible coupling between pump and engine
8—Rubber-tired roller bearing wheels, interchangeable with standard steel wheels

Capacity 80-100-125-150 gals. per min.
Pressures up to 500 pounds

THE BARNES MANUFACTURING CO.
923 Main St. Mansfield, Ohio

BARNES PUMPS

Mail this Coupon For Complete Specifications

The Barnes Manufacturing Company,
923 Main St., Mansfield, Ohio

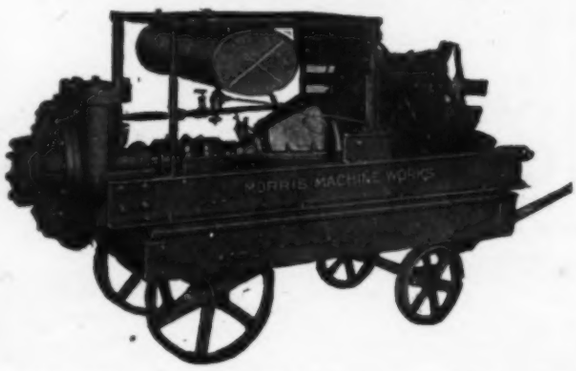
Please send me complete descriptive literature covering Barnes Road Pumps.

Name .....

Address .....

City ..... State.....

To make your unwatering and water supply problems easier!



THIS Morris Portable All-Purpose Pump handles anything from clear water to floating dirt, sand and gravel, delivers 300 to 600 gals. per min., can be used for heads up to 50 ft., and is easy to cart from one job to another. For general water supply, unwatering excavations, sumps, etc., it can't be beat.

Write for literature about this and other sizes of Morris Pumps

MORRIS MACHINE WORKS, Baldwinsville, N.Y.

MORRIS
CENTRIFUGAL PUMPS

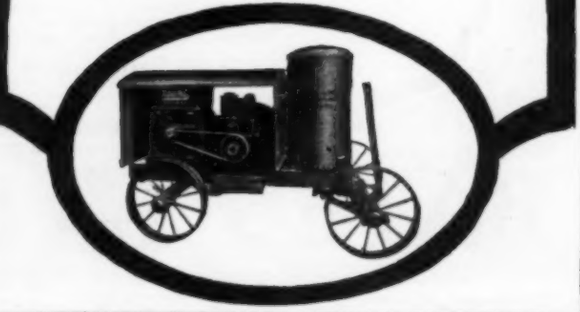
Buhl
AIR COMPRESSORS

Below is illustrated the BUHL Type C Portable Compressor—one of the many different types of this popular line. Moderate in original cost and low in upkeep.

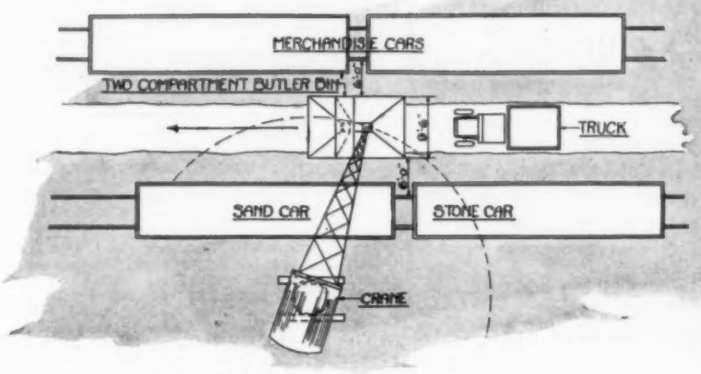
There are six sizes of portable air compressors in the BUHL line to choose from. For operating jack hammers, riveters, clay spades, concrete breakers, etc. The BUHL gives dependable air power at low cost—send for bulletins today.

Sales offices in principal cities

THE BUHL COMPANY
Manufacturers
37 W. Van Buren St., CHICAGO



IN CLOSE QUARTERS



USE BUTLER BINS

THE available location of a central proportioning plant is not always "made to order." In the installation above, there was not clearance enough to permit installation of a bin the *wide* way. It was a question of driving through the narrow way—or no bin.

But Butler Bins are made for the greatest utility. They are all designed so that when conditions demand you can drive through in either direction—or both.

When you buy Butlers you buy good construction and sturdy, dependable service, but you also get the greatest possible utility—a big asset in a tight place.

Buy Butler Bins for the next job.

BUTLER BIN COMPANY

WAUKESHA-WISCONSIN

BD 22

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UNDISPLAYED—RATE PER WORD:

Positions Wanted, 6 cents a word, minimum $1.25 an insertion, payable in advance.

Positions Vacant and all other classifications, 10 cents a word, minimum charge $2.00.

Proposals, 50 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals.)

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4 to 7 inches..... 7.25 an inch
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C.M.

POSITIONS VACANT

EXPERIENCED highway engineers wanted as inspectors and draftsmen anywhere in Pennsylvania State, training, experience, names of previous employers. Date available. Location desired and minimum salary expected. Apply by letter or in person to the Personnel Office, State Department of Highways, Harrisburg, Pennsylvania.

FOREMAN; from New Jersey or New York State preferred. With general knowledge of municipal work, consisting of curbing, grading, concreting and granite paving. Only thoroughly experienced need apply. Room 204, Trust Company of New Jersey Building, Journal Square, Jersey City, N. J.

FOREMAN, who has had experience in laying large size water mains; work in city; must be working foreman; good wages. P-19, Construction Methods, Tenth Ave. at 36th St., New York.

REINFORCED concrete detailer and estimator with two years' or more bar company experience. Excellent opportunity. Location Michigan. P-20, Construction Methods, 7 So. Dearborn St., Chicago, Ill.

STRUCTURAL detailers and checkers wanted for bridge and building work. Only experienced men need apply. Furnish references and state age, experience, and salary expected. Bethlehem Steel Company, Bethlehem, Pa.

WANTED experienced checkers for shop. Detail drawings of structural steel, give experience and previous employment, fully stating salary expected. Apply Box 2918, Winnipeg, Manitoba.

WANTED: Gasoline shovel operator for foreign work. Must speak Spanish. Give age, whether married or single, number of years experience with detailed record, salary expected and references. P-18, Construction Methods, 7 South Dearborn St., Chicago, Ill.

WANTED—Several designing draftsmen. A-1 men only, with experience on general industrial plant, structural steel, piping work, etc. New York district. P-596, Construction Methods, Tenth Ave. at 36th St., New York.

WANTED—Young man with good technical education who could develop into plant superintendent. Yadkin Brick Yards, New London, N. C.

RESIDENT engineer on reinforced concrete bridge in upper New York State, not less than 30 years old. Experienced in similar work. Position open in 2 to 4 weeks. State full details, experience, salary expected by letter to P-21, Construction Methods, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

Superintendents

SUPERINTENDENT of asphalt construction work and plants open for position; twenty-nine years active experience. PW-36, Construction Methods, Tenth Ave. at 36th St., New York.

SUPERINTENDENT or general foreman of highway work desires position with reliable contractor; twenty years' experience on heavy rock excavations, fine grading and concrete; can furnish best references. PW-17, Construction Methods, Tenth Ave. at 36th St., New York.

Who's Getting the Big Contracts?

On page 94 you will find a list of many of the most important contracts that have been let recently. This list shows where the construction dollars are being spent and will guide you to an employment opening or to equipment sales.

POSITIONS WANTED

Miscellaneous

CONSTRUCTION engineer, superintendent and estimator, experienced in bridge and road construction; capable of handling several operations, organizer. Available June 1st. PW-37, Construction Methods, 7 So. Dearborn St., Chicago, Ill.

CONSTRUCTION foreman, 40, married; 18 years' experience on public works and industrial construction; willing to go anywhere. PW-38, Construction Methods, Tenth Ave. at 36th St., New York.

CONTRACTORS — Field auditor; take charge of all accounting, years of experience; excellent references; available on short notice. PW-15, Construction Methods, 7 So. Dearborn St., Chicago, Ill.

EXECUTIVE engineer, Mem. Am. Soc. M.E., considerable experience, construction, construction machinery, rolling and floating equipment, field or office. Fluent Spanish. PW-39, Construction Methods, Tenth Ave. at 36th St., New York.

FIELD office job, experienced timekeeper, payroll clerk, paymaster, bookkeeper. Best references. PW-40, Construction Methods, Tenth Ave. at 36th St., New York.

HAVING 15 years' experience field construction, machine shop practice and machine design on elevators, conveyors, crushers, sand and gravel, coal and ashes handling plant layout, want opportunity with up to date company making advancements from inside; six years with present employers; am not a floater. PW-16, Construction Methods, Tenth Ave. at 36th St., New York.

HAYWARD dredge or Skidd machine operator, can set up machinery, do heavy rigging, pile driving and dock work. Would make a good contractors foreman. A. F. Ryden, North Haven, R. F. D. Montowese, Conn.

STEEL foreman (42), fifteen years' experience on the different systems of reinforcing; available June 1. W. S. Hicks, Brimfield, Mass.

Civil Engineers

A CIVIL and construction engineer, executive, practical, estimating, purchasing and designing experience, desires responsible permanent position. Salary $300. PW-22, Construction Methods, 7 So. Dearborn St., Chicago, Ill.

POSITIONS WANTED

CIVIL engineer, graduate, 32, desires position as assistant superintendent or resident engineer on building, bridge, or large construction project; experienced construction man as well as engineer. PW-23, Construction Methods, Tenth Ave. at 36th St., New York.

CIVIL engineer; have supervised a hundred miles of concrete pavement; surveys, plans, estimates, construction; municipal or county employment. PW-567, Construction Methods, 7 South Dearborn St., Chicago, Ill.

CIVIL engineer. Do you need a man who can handle your surveys, construction, or office work, who is a good draftsman himself, especially on maps, is honest, uses good judgment and does his work right. PW-24, Construction Methods, Tenth Ave. at 36th St., New York.

Designers & Draftsmen

GRADUATE engineer with 3 years' railway experience, desires position as draftsman or instrumentman in Middle West. PW-25, Construction Methods, Tenth Ave. at 36th St., New York.

Surveyors

I.C.S. man, five years' experience in highway construction, wants position as instrumentman. PW-26, Construction Methods, 7 South Dearborn St., Chicago, Ill.

Estimator

CONTRACTORS engineer, estimator, purchaser or office manager. Wide experience, buildings and general contracting. Now available. PW-27, Construction Methods, Tenth Ave. at 36th St., New York.

Bridge and Structural

STRUCTURAL engineer, C.E., 37, broad experience with steel fabricators in shop, drafting, designing, sales and executive work. Available on short notice for responsible position only. PW-28, Construction Methods, Tenth Ave. at 36th St., New York.

Superintendents

A capable superintendent and construction engineer, 22 years on roads, streets, heavy grading, excavating, concrete, general construction. Wide experience estimating. PW-29, Construction Methods, 7 South Dearborn St., Chicago, Ill.

AN EXECUTIVE desires permanent connection as manager or general superintendent with contracting corporation handling commercial or industrial buildings. PW-30, Construction Methods, Tenth Ave. at 36th St., New York.

BUILDING construction superintendent or office engineer, wide experience industrial and commercial buildings, C.E. graduate, age 37. Salary $100 per week. Available immediately. W. C. A., 764 Bloomfield Ave., Montclair, N. J.

BUILDING superintendent with 20 years of experience in all classes of construction concrete, brick, wood and steel, deep foundation work, also concrete bridge construction. PW-31, Construction Methods, Tenth Ave. at 36th St., New York.

"FOR SALE OR RENT"

CONCRETE MIXERS

110—Concrete Mixers, sizes 56-S, cap. 2 yd. 28-S, cap. 1 yd.; 21-S, cap. ¾ yd. With steam or electric power with side loaders or batch hoppers. Following makes: Marsh-Capron, Koehring, Milwaukee, Ransome Smith, Smith-Chicago, Rex, Lakewood, Foote, Cube or Oshkosh.

58—7-S, cap. 1 bag, with low charging platforms, with gasoline engines.

DERRICKS

45—American Stiff Leg Derricks. Capacity 5 to 8 tons, with 14-in. square timbers, booms from 50 to 70 ft., with 12-ft. steel bull wheel.

24—American Stiff Leg Derricks. Capacity 8 to 12 tons, with 16-in square masts, booms from 60 to 80 ft., with truss rods and 16-ft. steel bull wheel. Above derricks can be furnished for hook work or bucket operation.

3—25-ton all-steel, stiff leg Derricks, with 80 ft. boom, 40-ft. mast, legs and sills in proportion, with or without bull wheel.

HOISTS

30—American double drum, hoists, with attached swinger gear, capacity 6000 lbs. on a single line, with 37 to 50 hp. A.C., 60 cy., 3 ph. 220 or 440 v. motor, or with 35 hp., 220-v. direct current motor. Can also furnish with new 55 hp. Climax 4 cyl. gasoline engine.

6—Single drum, high speed, Electric Concrete Tower Hoists: Flory, Lambert, Lidgerwood and Thomas, 100 hp., 75 hp. and 50 hp.

74—3-drum, 2-drum and single drum, size 12x12, 10x12, 9x10, 8¼x10, 7x10, 6¼x10, 5½x8, 4¾x6, all makes, also separate and attached swingers.

1—50 hp. Novo double drum gasoline with attached elevator sheave.

Write for Stock List 120 for Stock of

BOILERS, BUCKETS, COMPRESSORS, CONCRETE TOWER EQUIPMENT, CRANES, DRAGLINES, LOCOMOTIVES, PUMPS, RAIL AND TRACK SAW RIGS, STEAM HAMMERS, STEEL PILING

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Pittsburgh, Pa.
857 Empire Bldg.
Phone: Grant 5148

Chicago, Ill.
1457 Roanoke Bldg.
Phone: Randolph 6586

Philadelphia, Pa.
657 Horn Bldg., 1601 Chestnut St.
Phone: Rittenhouse 5498

Why buy wood sheeting?

You can save money by renting Steel Sheet-Piling from Wemlinger, Inc.—and do a more satisfactory job.

We maintain stocks of Steel Sheet-Piling throughout the country, for sale or for rent.

Wemlinger, Inc.
149 Broadway, New York

FOR SALE OR RENT

LOCOMOTIVES

2—20 ton Std. Ga. Plymouth, Gasoline. New 1926.
4—12 and 14 ton Std. Ga. Whitcomb Gasoline. New 1925.
7—24-in. and 36-in. Ga. Whitcomb and Plymouth Gasoline Locomotives, 3-4-6-7-8 ton sizes.
1—45-ton Std. Ga. S. T. American, 180 lbs.
2—100 ton Std. Ga. Consolidation, 200 lbs.

CRANES—DRAGLINES—SHOVELS

1—Northwest, 104 gas, cat. shovel.
3—O & S Gas, Cat. Cranes, 40-ft. boom. Bargains.
1—Byers Gas. Traction Crane, 30-ft. boom.
4—Link-Belt Gas, Cat. Cranes and Shovels. Like new.
2—Erie B cat. Steam Shovels, new 1924-5.
2—Erie A Cat. Steam Shovels, ⅝ yd. Good condition.
2—Class 14 Bucyrus team Dragline, caterpillar and skid and roller.
3—Cl. 24 Bucyrus Electric Draglines, 100 ft. boom.

MISCELLANEOUS.

2—No. 5 Gates Gyratory Crushers.
3—Symons Disc. 18-, 24-, 48-in. sizes, brgs.
2—24-in. Belt Conveyors 160 centers.
1—76-ft. Centers 16-in. Bucket Elevators.

Houck-Bohan Equipment Co.
178 West Adams St., Chicago
Phone Franklin 2468.

Locomotives, Compressors, Pavers, large Stripping Shovels, etc. Advise us of your requirements.

If you don't see the equipment you need advertised on this page, send a list of your requirements to the Searchlight Department, Construction Methods, 10th Ave. at 36th St., N. Y. C. You will be put in prompt touch with reliable sources of supply.

ONE FLAT CAR

Iron Frame. Good Condition A Bargain.

ACORN IRON & METAL CO.
Atlantic City, N. J.

Largest Stock of Used Surveying Instruments in this Country

Satisfaction guaranteed or money refunded. Write for complete list and catalog of our high grade instruments and supplies for civil engineers, surveyors, mining, builders, contractors, etc.; 40 years' experience in repairing instruments of all makes at reasonable prices. Prompt service.

WISSLER INSTRUMENT CO.
615 N. Broadway, St. Louis, Mo.

RAILS

DEPENDABLE SERVICE

Track Supplies — Contractor's Plant

E. C. SHERWOOD, 48 CHURCH STREET NEW YORK

STEEL SHEET PILING

LINDHEIMER — SUCCESSFUL PERFORMANCE — SOLD-AGGRATED — SERVICE

Saves you money and trouble in Foundation, Cofferdam, and Sewer work.

Bought-Sold-Rented—Always carried in stock

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S·W·LINDHEIMER
13 South Clark St. CHICAGO

ZELNICKER'S BULLETIN

30 Years in Rails and Equipment

Tanks
Oil Engines
Hoists
Cranes
Shovels, etc.
Steel Piling Pipe

ZELNICKER ST. LOUIS

364th Edition is yours for the asking

Who's Getting the Big Contracts?

A Monthly Guide to Where the Construction Dollar is Being Spent

ON THIS PAGE *Construction Methods* lists some of the high-spot jobs for which important contracts have recently been let.

If you are looking for equipment prospects or for an employment opening in new territory, the information on this page may be of help in indicating where construction is active.

The contracts listed are, of course, only a few of the total number recently let. You may wish to ask about others. If so, address your inquiries to:

Searchlight Dept., *Construction Methods*, Tenth Ave. at 36th St., New York

Far West

Los Angeles, Calif.
Mercantile: $6,000,000
J. V. McNeil Co., 5860 Avalon Blvd.
Apartment Hotel: $1,000,000
United Pacific Securities Corp., 821 Security Title Insurance Bldg.
Owner builds
Sewers: $2,121,645
W. F. Peck, 1120 Las Palmas Ave.
Sewers: $932,725
Torson Constr. Co., 1290 West Anaheim St., Long Beach.
Apartment: $375,000
L. T. Mayo, Black Bldg.

Berkeley, Calif.
Factory: $250,000
Austin Co. of Calif., 777 East Washington St., Los Angeles.

San Carlos, Calif.
Streets: $207,500
Robin Constr. Co., 25 Taylor St., San Francisco.

Portland, Ore.
Medical and dental office: $850,000
Dougan Hammond Constr. Co., Portland.

Long Beach, Calif.
Department store: $500,000
Meyer & Holler, Wright-Callender Bldg.

Oakland, Calif.
Apartment: $600,000
Starr, Thebo & Anderton, Sharon Bldg., San Francisco.

Corvallis, Ore.
Dormitory: $331,600
L. M. Travers, Portland, Ore.

Seattle, Wash.
Street lighting system: $286,445
Ne Page McKenny Ave., Armour Bldg.

Sacramento, Calif.
Cannery: $250,000
Sacramento Industrial Corp., Sacramento.

West of Miss.

St. Louis, Mo.
Apartment: Est. $1,000,000
Seldon-Breck Constr. Co., 1108 Fullerton Bldg.

Montana
Railway extension: Est. $2,000,000
A. Guthrie Co., 1209 Builders Exchange Bldg., St. Paul, Minn.

Texas
Oil pipe line: $1,500,000
Oklahoma Constr. Co., c/o Pasotex Refining Co., El Paso.
Highways: Total $1,536,786
Russ Mitchell, Inc., Houston ($355,017).
A. Smith, Bryan, ($118,890).
F. P. McElwrath, Corsicana ($213,405) and others.

Webster Groves, Mo.
Apartment: Est. $500,000
Widmer Eng. Co., Laclede Gas Light Bldg., St. Louis.

Willmar, Minn.
Gas plant: $200,000
Amer. Gas Constr. Co., Newton, Ia. Owner builds.

Arkansas
Bridges: Total $504,756
F. Luttjohann, 2053 Kansas St., Topeka, Kan. ($197,032).
Maxwell Constr. Co., Columbus, Kan. ($78,059).

St. Louis, Mo.
Stores: Est. $750,000
Westlake Constr. Co., Ry. Exch. Bldg.

Enid, Okla.
Flour mill and elevator: $700,000
Jones & Hettelsater Co., Mutual Bldg., Kansas City, Mo.

Milwaukee, Wis.
Public safety: Total $1,108,682
Bentley Bros. 808 South Pierce St. ($467,980) and others.

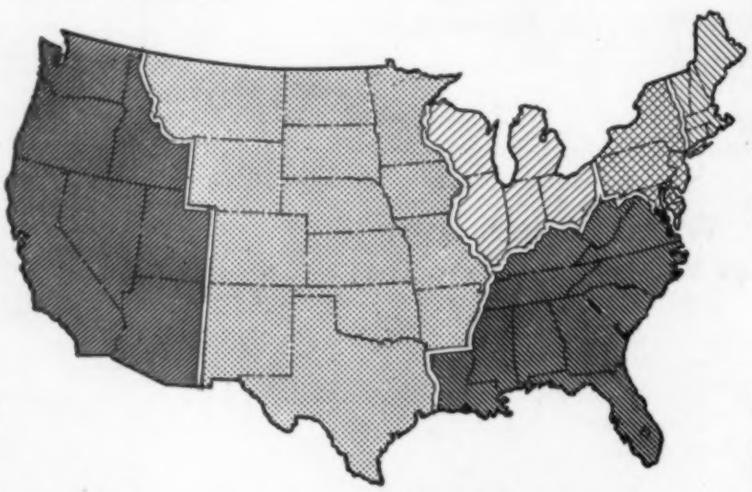
Minneapolis, Minn.
Garage: Est. $500,000
C. F. Haglin & Sons Co., 920 Nat'l Bldg.

Middle West

Dayton, O.
Hotel: Est. $3,000,000
Starrett Co., 160 North La Salle St., Chicago, Ill.
Y.M.C.A.: Est. $1,500,000
Industrial Bldg. Co. Reibold Bldg. (excavations, etc.).
J. G. Pool Co., Ludlow Bldg. (structural steel).

South

Charleston, S. C.
Bridge: Est. $5,750,000
Foundation Co., 120 Liberty St., New York.
McClintic-Marshall Co., Oliver Bldg., Pittsburgh, Pa., and others.



Chicago, Ill.
Office and store: Est. $2,500,000
McLennan Constr. Co., 307 North Michigan Ave.

Sewage Treatment: $5,282,188
Forschner Contg. Co., 3153 Bryn Mawr Ave.

Bank and office: Est. $1,000,000
Merick Constr. Co., 1954 West 71st St.

Paving: $1,000,000
White Paving Co., 1735 Fullerton Ave.

Apartment Hotel: Est. $1,500,000
C. E. Erickson, 4753 Broadway

Printing plant: Est. $2,000,000
E. L. Schneidenhelm & Co., 111 West Monroe St.

Club and office: Est. $1,000,000
H. E. Erickson & Sons, 228 North La Salle St. and others.

Apartment: Est. $3,000,000
Bogeans Constr. Co., 180 N. Michigan Ave.

Kalamazoo, Mich.
Paper plant: Est. $1,000,000
O. F. Miller Constr. Co., Pratt Bldg.

Detroit, Mich.
Office: Est. $1,600,000
A. W. Kutsche, 2111 Woodward Ave.

Bank: Est. $800,000
Hazelton & Clark Co., 1359 Book Bldg.

South Charleston, W. Va.
Factory: Est. $1,000,000
Stone & Webster, 4 Milk St., Boston, Mass.

North Carolina
Streets and roads: Total, $1,613,443
Brown Paving Co., Lexington ($295,353).
G. R. Martin, Salisbury ($280,596) and others.

Atlanta, Ga.
Office: $500,000
United Engineers & Constrs. Inc., Broad and Arch Sts., Phila., Pa.

Miami Beach, Fla.
Jetties: $203,594
Clark Dredging Co., 357 S.W.N. River Dr., Miami.

Shreveport, La.
Viaduct: $359,470
K. C. Wilson, Shreveport.

Alabama
Streets and roads: Total $2,332,363
Couch Constr. Co., Dothan ($265,533).
Hazen & Grimes, Sarasota, Fla. ($231,711) and others.

Fort Bragg, N. C.
Barracks: $480,135
W. P. Rose, Goldsboro.

Tennessee
Highways: Total $1,906,052
Municipal Paving Co., Nashville ($257,964).
J. L. Humbard, Tennessee General Bldg., Knoxville ($210,727).

Middle Atlantic

Philadelphia, Pa.
Apartment: Est. $2,500,000
United Engineers & Constr. Inc., Broad & Arch Sts.,
Y. M. C. A.: Est. $1,000,000
Irwin & Leighton, 1505 Race St.
Apartment: Est. $3,300,000
Murphy Quigley & Co., 1524 Sansom St.

New York, N. Y.
Hotel: Est. $4,500,000
Thompson Starrett Co., 250 Park Ave.
Apartments: $3,350,000
J. Tishman & Sons, 285 Madison Ave. Separate contracts.
Apartments: $2,000,000
Dwellers Building Co., 69 5th Ave. Separate contracts.
Terminal: Est. $8,000,000
G. A. Fuller Co., 949 Broadway.
Office: Est. $3,000,000
Starrett Bros., 101 Park Ave.
Apartment: $1,000,000
Elbar Realty Co., 16 East 52nd St. Separate contracts.

Brooklyn, N. Y.
Hotel: $2,000,000
Clark-Henry Corp. c/o Bing & Bing, 119 W. 40th St. Separate contracts.
Subway: $3,200,000
Rodgers & Haggerty, Grand Central Terminal Bldg., N. Y.

New Brunswick, N. J.
Bridge: $1,509,373
Parker Graham, Inc., 5 Colt St., Paterson, N. J.

Pennsylvania and New Jersey
Bridge: $1,373,194
American Bridge Co., Widner Bldg., Phila., Pa.

Baltimore, Md.
Hospital: $450,000
B. F. Bennett Bldg., Co., 123 South Howard St.

New England

Boston, Mass.
Light manufacturing: Est. $800,000
E. L. Snider, 18 Tremont St.

Vermont
Bridge: $177,400
J. E. Cashman, Burlington

Providence, R. I.
High school: $259,469
Balchin Constr. Corp. 75 Westminster St.

Maine
Paving: Total, $276,928
A. D. Bridges, Hazardville, Conn. ($54,600).
Kennebeck Constr. Corp., Gardiner ($71,294) and others.

Connecticut
Paving: Total $1,581,231
J. De Michiel & Bros. ($726,348) 58 High St., Torrington N. Benvenuti. ($332,973) 74 Goshen St., New London.

Cambridge, Mass.
Apartment: $500,000
Shapiro & Allen, 24 School St., Boston. Separate Contracts.

Dorchester, Mass.
School: Est. $400,000
Marden & Orlando, 146 River Rd., Winthrop.

Hartford, Conn.
Paving: $292,143
Edward Balf Co., 14 Haynes St.

East Boston, Mass.
Theatre and store: Est. $300,000
B. Steinberg, 6 Beacon St., Boston

Lynn, Mass.
Boiler house: Est. $225,000
Turner Const. Co., 178 Tremont St., Boston.

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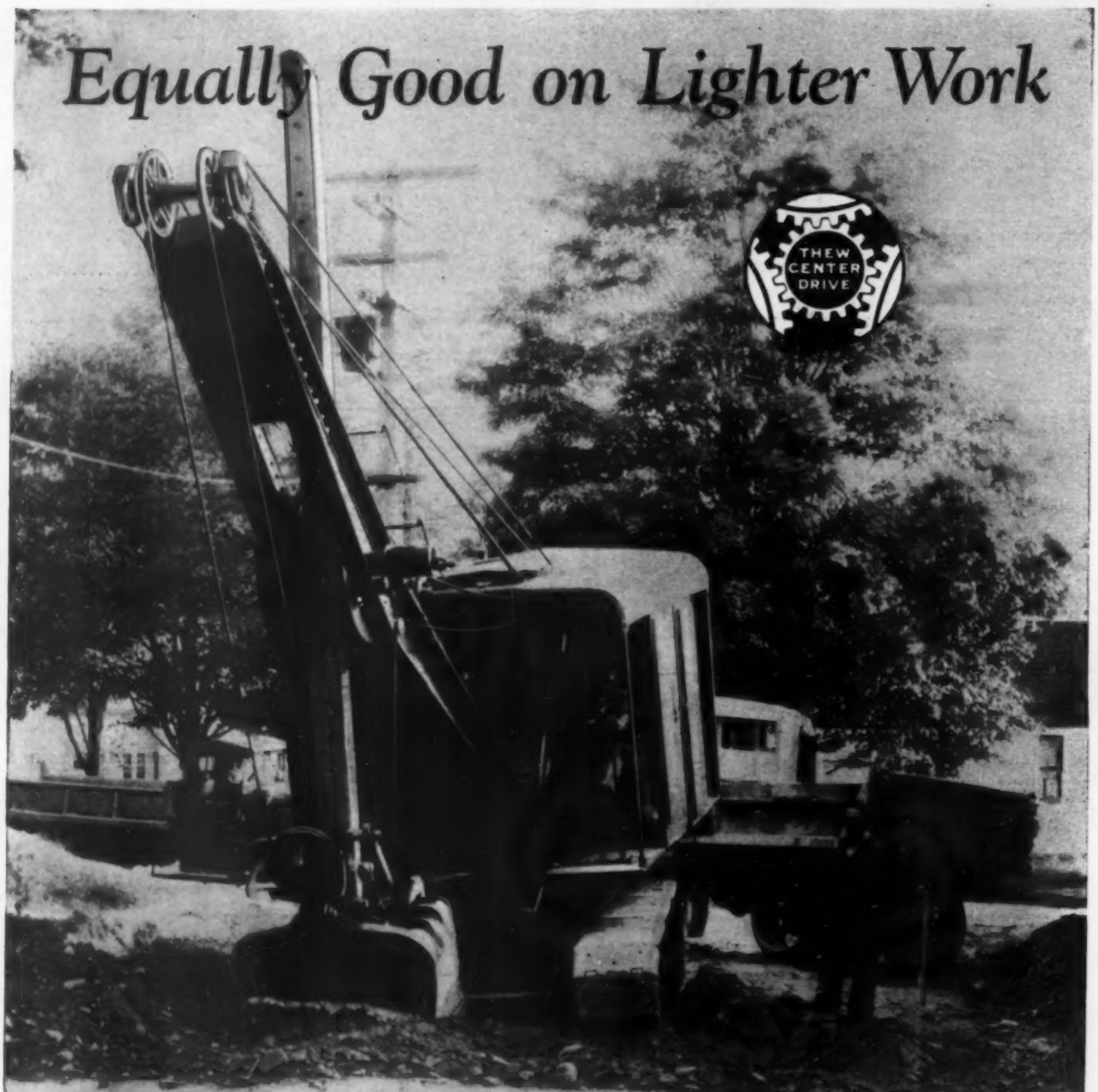

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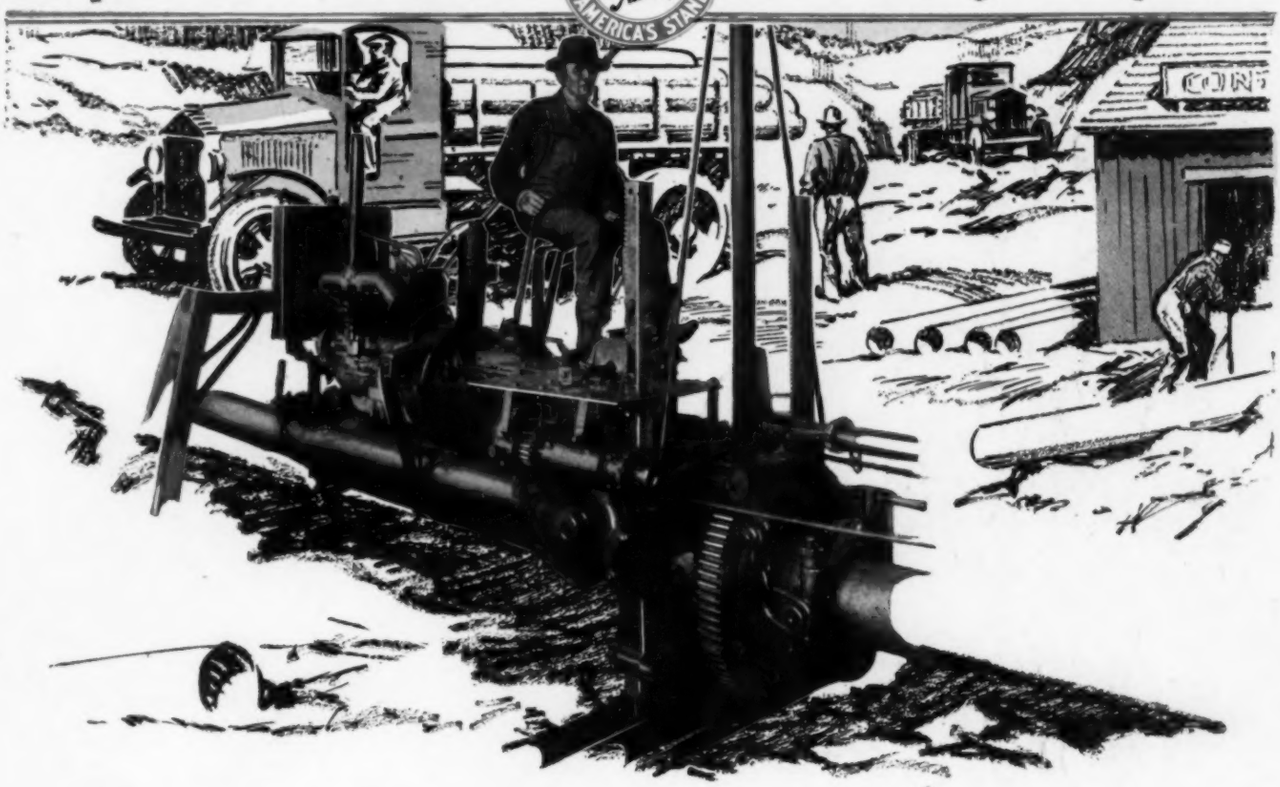

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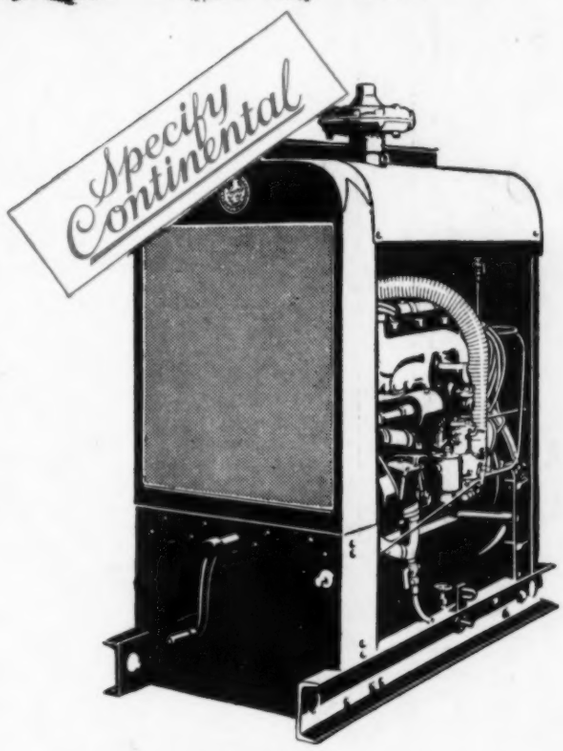

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